DRAFT CONTAMINATION ASSESSMENT REPORT FOR GAS HILL FUEL FARM NAS JACKSONVILLE FL

11/1/1993

U S ARMY CORPS OF ENGINEERS

DRAFT

CONTAMINATION ASSESSMENT REPORT

NAVAL AIR STATION JACKSONVILLE
FACILITY 159 - GAS HILL FUEL FARM

JACKSONVILLE, FLORIDA

PREPARED FOR

UNITED STATES NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
SAVANNAH, GEORGIA

SEPTEMBER 1992

EXECUTIVE SUMMARY

A contamination assessment has determined that ground-water and soil contamination around the underground petroleum storage tanks at the Naval Air Station Jacksonville Gas Hill (Facility 159) is in violation of Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC), regulations for underground petroleum contamination.

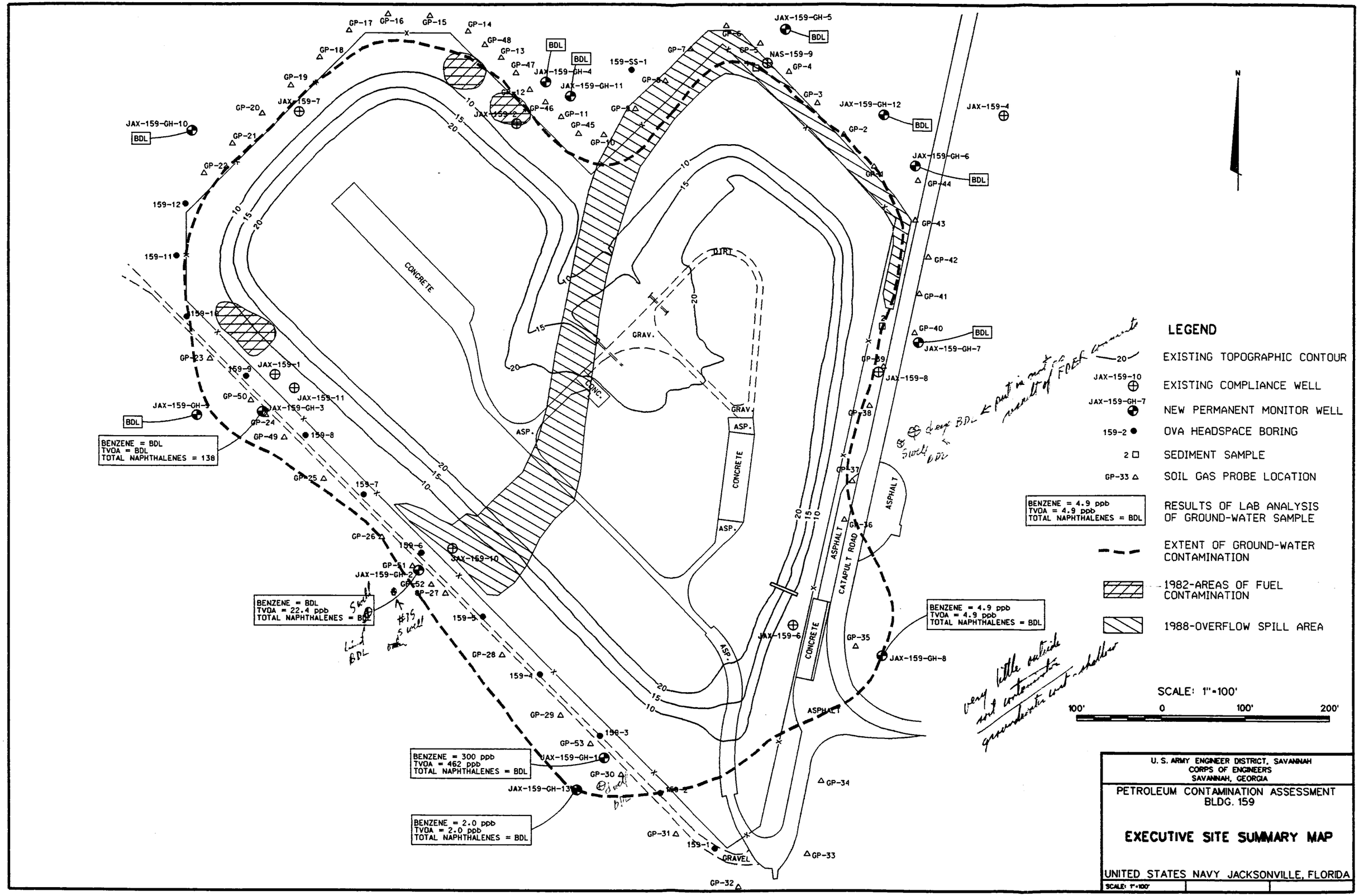
Although 8 of 13 ground-water monitoring wells installed around the perimeter of the facility, as part of this contamination assessment, indicated the absence of contaminants that make up the Florida Kerosene Group (FDER 17-770), several of the wells indicated levels of contamination that exceed regulatory standards for Benzene, Total Naphthalenes, Total Volatile Organic Aromatics (TVOAs), and lead. Also, during periodic water level readings taken during the investigation, another previously installed monitor well, inside the facility boundaries, yielded varying amounts of free floating petroleum product , ranging from 0.10 to 0.30 foot.

Chemical analyses of water samples from JAX-159-GH-8 indicated minor amounts of benzene (4.9µg/l). This well is directly down-gradient of a closed bulk fuel loading facility. It is believed that spillage and product handling practices during the facility's operation have resulted in the contamination detected by this well.

The contaminant plume around and under the facility, based on laboratory analytical results, is shown on the Executive Summary Map on the following page. The contamination at this site remains entirely on Navy property. The vertical extent of contamination does not appear to exceed 25 feet below land surface, based on the results of laboratory analyses of ground-water samples. The subsurface soil characteristics have apparently tended to retard the flow of any contaminant plume from the source area.

The petroleum contamination at the site is believed to be due to the cumulative effects of spills due to overtopping of tanks, localized spillage from product transfer operations, and leakage from the tanks and appurtenances.

Based on the findings of this contamination assessment, it is recommended that a Remedial Action Plan (RAP) be prepared to address the cleanup of the contamination.


GP-17
GP-16
GP-15
GP-14
GP-48
GP-13
GP-47
GP-18
GP-19
GP-20
JAX-159-7
JAX-159-GH-10
BDL
GP-21
GP-22
159-12
159-11
159-10
GP-23
159-9
JAX-159-1
JAX-159-11
GP-50
JAX-159-GH-3
JAX-159-GH-9
BDL
GP-24
GP-49
159-8
BENZENE = BDL
TVOA = BDL
TOTAL NAPHTHALENES = 138
GP-25
159-7
GP-26
159-6
GP-51
JAX-159-GH-2
GP-52
GP-27
JAX-159-10
BENZENE = BDL
TVOA = 22.4 ppb
TOTAL NAPHTHALENES = BDL
159-5
GP-28
159-4
GP-29
159-3
GP-53
JAX-159-GH-1
GP-30
JAX-159-GH-13
159-2
BENZENE = 300 ppb
TVOA = 462 ppb
TOTAL NAPHTHALENES = BDL
BENZENE = 2.0 ppb
TVOA = 2.0 ppb
TOTAL NAPHTHALENES = BDL
GP-31
159-1
GRAVEL
GP-32
GP-33
GP-34
GP-35
GP-36
GP-37
GP-38
GP-39
JAX-159-8
GP-40
JAX-159-GH-7
GP-41
GP-42
GP-43
JAX-159-GH-6
GP-44
JAX-159-GH-12
JAX-159-4
GP-2
GP-3
NAS-159-9
GP-4
JAX-159-GH-5
GP-5
GP-6
GP-7
GP-8
159-SS-1
JAX-159-GH-11
JAX-159-GH-4
GP-46
GP-11
GP-45
GP-10
GP-9
JAX-159-2
GP-12
GP-1
JAX-159-GH-8
JAX-159-6
CONCRETE
ASP.
GRAV.
DIRT
CONC.
ASPHALT
CATAPULT ROAD
10
15
20
N
LEGEND
EXISTING TOPOGRAPHIC CONTOUR
JAX-159-10 EXISTING COMPLIANCE WELL
JAX-159-GH-7 NEW PERMANENT MONITOR WELL
159-2 OVA HEADSPACE BORING
2 SEDIMENT SAMPLE
GP-33 SOIL GAS PROBE LOCATION
BENZENE = 4.9 ppb
TVOA = 4.9 ppb
TOTAL NAPHTHALENES = BDL
RESULTS OF LAB ANALYSIS OF GROUND-WATER SAMPLE
EXTENT OF GROUND-WATER CONTAMINATION
1982-AREAS OF FUEL CONTAMINATION
1988-OVERFLOW SPILL AREA
SCALE: 1"=100'
100' 0 100' 200'
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PETROLEUM CONTAMINATION ASSESSMENT
BLDG. 159
EXECUTIVE SITE SUMMARY MAP
UNITED STATES NAVY JACKSONVILLE, FLORIDA
SCALE: 1"=100'

FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual states, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks) and Title 40 CFR 281 (Approval of State Underground Storage Tank Programs). Title 40 CFR 280 was revised and published on 23 September 1988 and became effective 22 December 1988.

The Navy's UST Program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC) (State Underground Petroleum Environmental Response) regulations on petroleum contamination in Florida's environment resulting form spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Commanding Officer, Naval Station Jacksonville, Jacksonville, Florida, or to Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 18~~2~~47, at ~~AUTOVON~~ DSN 563-0528 or 803-743-0528.

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ACRONYMS AND ABBREVIATIONS

The following list contains many of the acronyms, abbreviations, and units of measure used in this report.

BDL	below detection limits
BETX	benzene, ethyl benzene, toluene, and xylenes
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CESAS	Corps of Engineers, South Atlantic Division, Savannah District
CFR	Code of Federal Regulations
CH	High plasticity clay (Unified Soil Classification System)
CL	Low plasticity clay (Unified Soil Classification System)
COE	Corps of Engineers
CompQAP	Comprehensive Quality Assurance Plan
°C	degrees Celsius
EDB	ethylene dibromide
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
ft/day	feet per day
GC	gas chromatograph
gpd/ft	gallons per day per foot
GPM	gallons per minute
HSWA	Hazardous and Solid Waste Amendments of 1984
K	hydraulic conductivity
MH	High plasticity silt (Unified Soil Classification System)
ML	Low plasticity silt (Unified Soil Classification System)
msl	mean sea level
MGD	Million gallons per day
MTBE	methyl-tert-butyl-ether
OH	High plasticity organic clay (Unified Soil Classification System)
OL	Low plasticity organic silt or clayey silt (Unified Soil Classification System)
OVA	organic vapor analyzer
OVM	organic vapor monitor (see PID)
PAH	polynuclear aromatic hydrocarbons
PCA	Preliminary Contamination Assessment
PCAR	Preliminary Contamination Assessment Report
PID	Photo-ionization Detector
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
SC	Clayey sand (Unified Soil Classification System)
SM	Silty sand (Unified Soil Classification System)
SP	Poorly graded sand (Unified Soil Classification System)
SOUTHNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SPT	standard penetration test
SWDA	Solid Waste Disposal Act of 1965

ACRONYMS AND ABBREVIATIONS (cont'd)

T	transmissivity
TRPH	total recoverable petroleum hydrocarbons
µg/l	micrograms per liter
µmhos/cm	micromhos per centimeter
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
V	pore water velocity
VOA	volatile organic aromatic

1.0 INTRODUCTION

The U.S. Army Corps of Engineers, Savannah District was contracted by Southern Division Naval Facilities Engineering Command, Charleston, South Carolina, to perform a contamination assessment at the Gas Hill Fuel Farm (Facility 159), Naval Air Station Jacksonville, Jacksonville, Florida.

The purpose of the assessment was to determine the degree and extent of contamination to soil and ground water caused by petroleum products suspected of leaking from underground storage tanks at the site. The assessment of the site was conducted in several phases, from June 1991 through January 1992 and included:

- Performing headspace analyses and organic vapor survey of soils to determine the extent of soil contamination;
- The installation and sampling of monitoring wells to determine the vertical and horizontal extent of petroleum contamination of ground water;
- The collection of water level data to determine direction of ground-water flow;
- Performing recovery testing on selected monitoring wells to estimate aquifer characteristics; and
- Performing a survey of potable water wells in the vicinity of the site.

The work presented in this contamination assessment report (CAR) was performed in compliance with Chapter 17-770, Florida Administrative Code (FAC), State Underground Petroleum Environmental Response, and Florida Department of Environmental Regulation (FDER) "Guidelines for Assessment and Remediation of Petroleum Contaminated Soils."

2.0 BACKGROUND

2.1 Site Description

Naval Air Station Jacksonville is located approximately 8 miles south of Jacksonville, Florida, on the west bank of the St. Johns River. The Gas Hill bulk storage site (Facility 159) is located north of the runway and near the banks of the St. Johns River (see figure 1). Gas Hill is a bulk fuel storage and distribution facility.

2.2 Site History

Gas Hill was activated in 1943 as a bulk fuel storage facility with 15 storage tanks and a total capacity of approximately 4 million gallons of various petroleum based fuels (see table 1). In the late 1970's, two tanks (159-G and 159-I) were struck by lightning and subsequently taken out of service and properly abandoned. In 1982, NAS personnel reported fuel odor and the presence of fuel saturated soil at several locations in the embankment around the tanks. Shallow excavations in these areas confirmed the presence of JP-5 with free floating product thicknesses of as much as 4 inches. Preliminary contamination studies were begun in 1983 by Geraghty and Miller, Inc. and later by E. C. Jordan Co. In February 1988, tank 159-C was overfilled, and an estimated 15,400 gallons of JP-5 were released onto the ground surface. (see figure 3). The majority of the fuel was absorbed into the surficial soils on the site.

A contamination assessment was begun at the site in August 1991 to determine the nature and extent of petroleum contamination as required by Chapter 17-770, FAC.

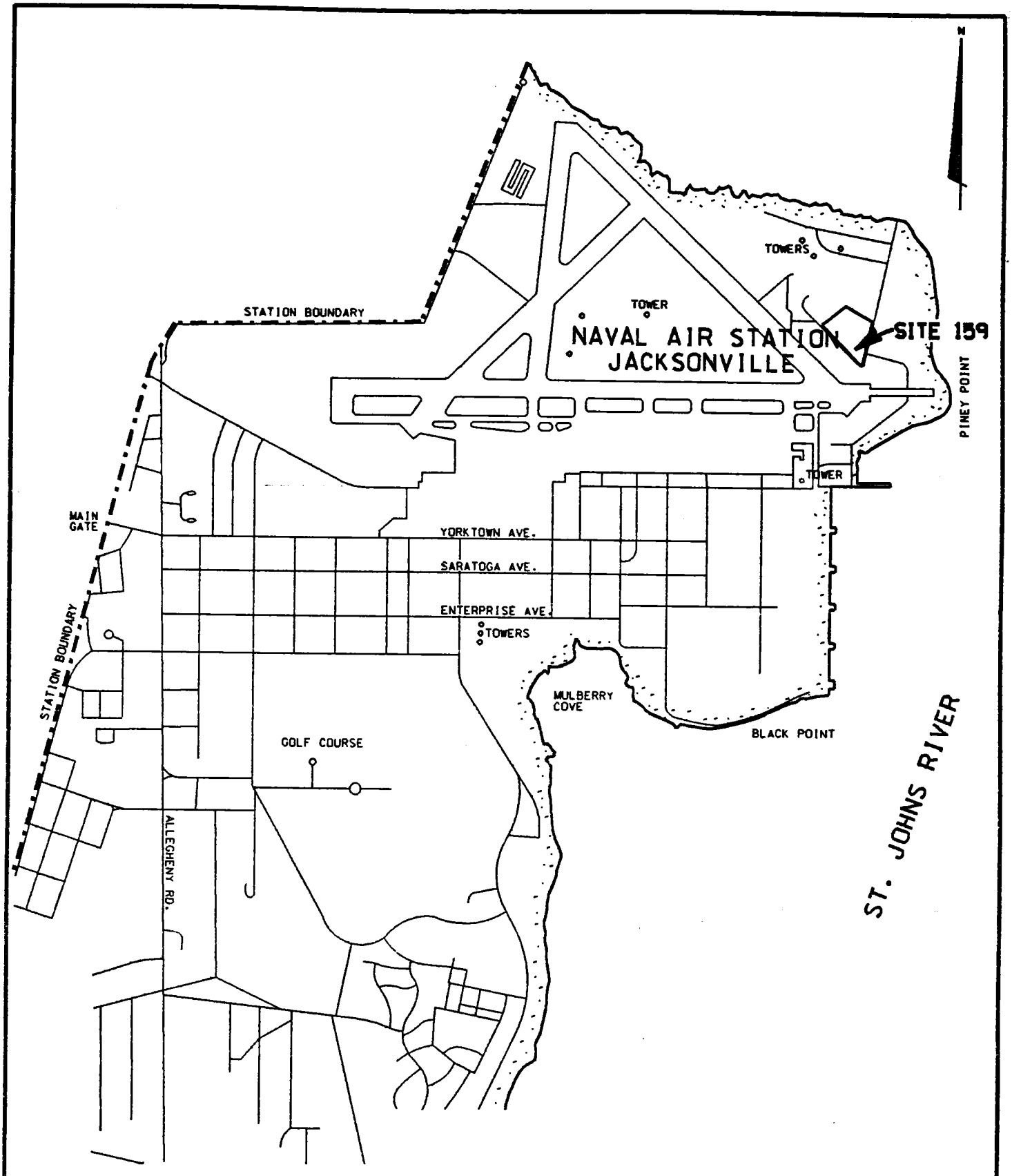

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FIGURE 1

SITE LOCATION MAP

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: 1" = 2000'

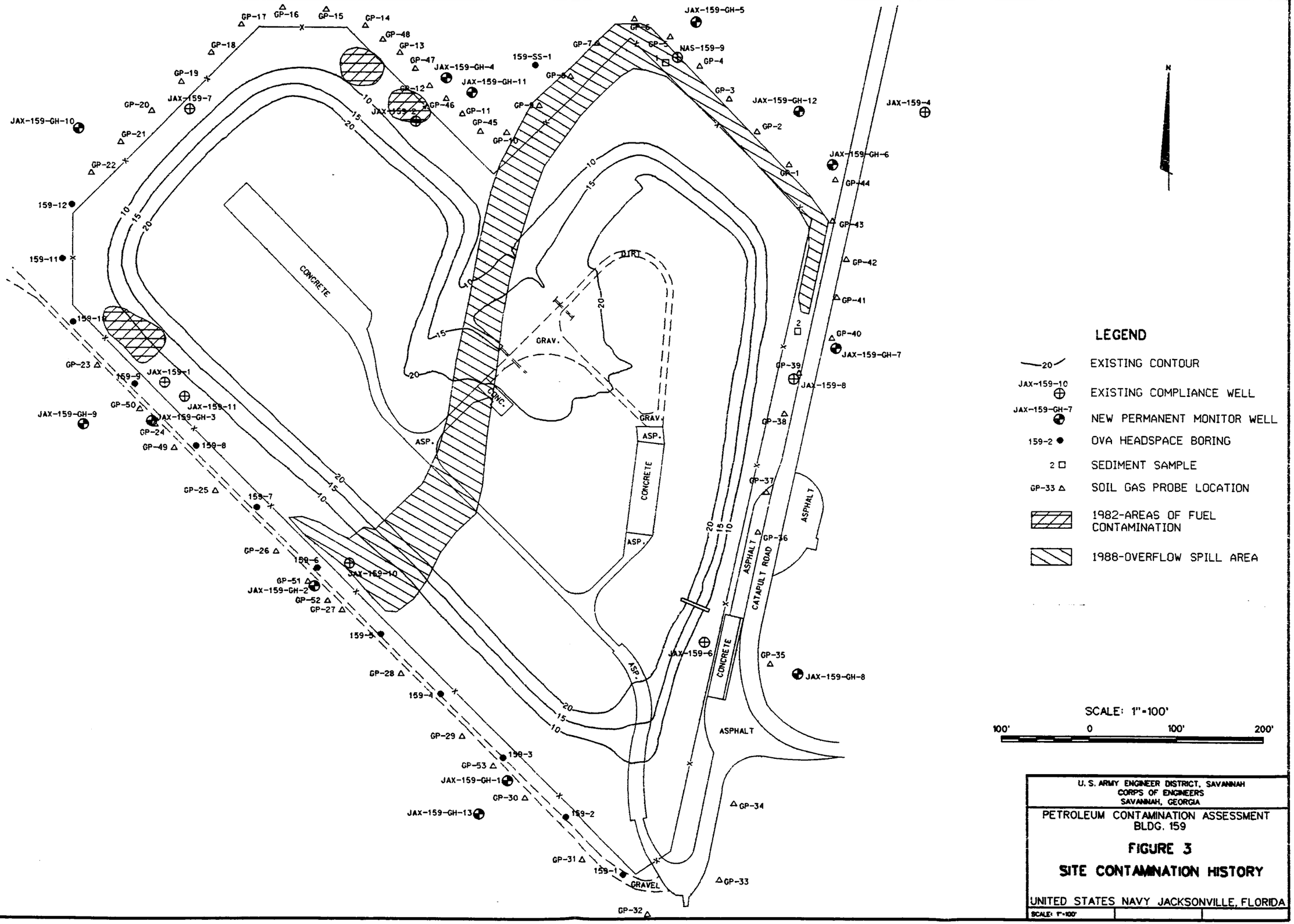

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FIGURE 3

SITE CONTAMINATION HISTORY

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: 1"=100'

RF=J:\EMD\SMITH\JAX159\SITEPLAN.DGN 10,11,60
RF=J:\EMD\SMITH\JAX159\HISTROP.DGN

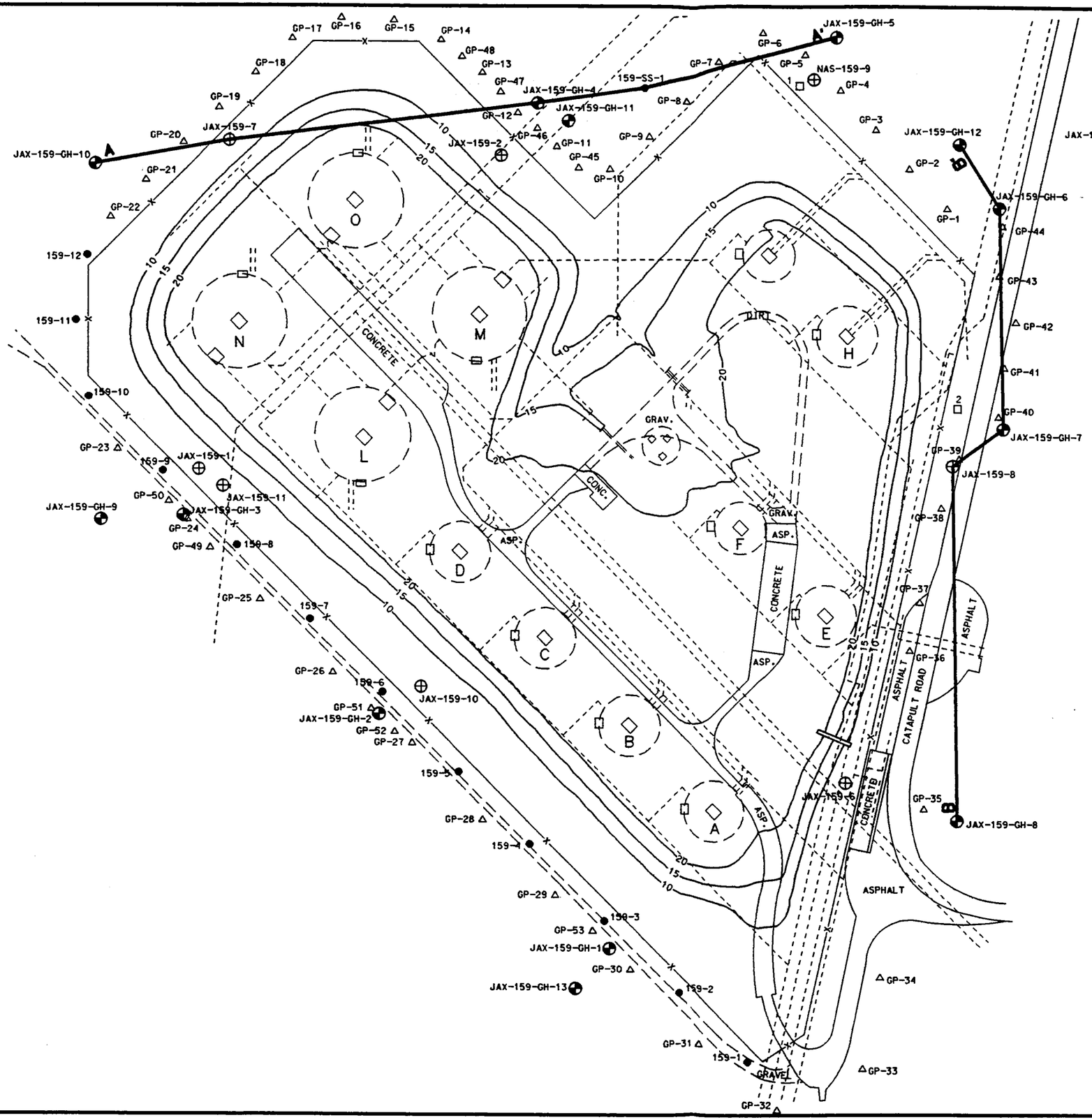

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FIGURE 2

SITE PLAN

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: 1"=100'

TABLE 1

STORAGE TANK DATA

FACILITY 159 - GAS HILL FUEL FARM
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

TANK No.	DATE INSTALLED	CAPACITY (gal)	CONSTRUCTION INFORMATION	CONTENTS	STATUS
159-A	1943	250,000	Concrete, interior lined	JP-5	I
159-B	1943	250,000	Concrete, interior lined	JP-5	I
159-C	1943	250,000	Concrete, interior lined	JP-5	I
159-D	1943	250,000	Concrete, interior lined	JP-5	I
159-E	1943	250,000	Concrete, interior lined	Avgas	O
159-F	1943	100,000	Concrete, interior lined	Avgas	O
159-G	1943	50,000	Concrete, interior lined	JP-5	O
159-H	1943	250,000	Concrete, interior lined	JP-5	I
159-I	1943	100,000	Concrete, interior lined	JP-5	O
159-J	1944	1,550	Steel, interior lined	Diesel	R
159-K	1944	1,550	Steel, interior lined	Diesel	R
159-L	1953	567,000	Steel, interior lined, cathodic protection	JP-5	O
159-M	1953	567,000	Steel, interior lined, cathodic protection	JP-5	I
159-N	1953	567,000	Steel, interior lined, cathodic protection	JP-5	I
159-O	1953	567,000	Steel, interior lined, cathodic protection	JP-5	I

Notes: I = In Service
R = Removed
O = Out of Service

9/10/92
tanks.tbl

3.0 SITE CONDITIONS

3.1 Physiography

Regional physiography is discussed in appendix A. The site lies within the Coastal Lowland physiographic division of northeastern Florida, which runs roughly parallel to the coastline and extends from the Atlantic Ocean to just west of downtown Jacksonville. Site elevations range from approximately 6 to 9 feet above msl. Site surface drainage is controlled by the St. Johns River to the east.

3.2 Regional Hydrogeology

The southeast Georgia and northeast Florida area is underlain by two main aquifer systems: the Surficial aquifer system and the Floridan aquifer system. A third aquifer system, the Southeastern Coastal Plain aquifer system, underlies the Floridan aquifer system in southeast Georgia, portions of northeast Florida, and the Florida panhandle. These systems are further discussed in appendix A.

3.3 Site Hydrogeology

Naval Air Station Jacksonville is underlain by three water-bearing zones; the surficial aquifer, a shallow rock aquifer, and the Floridan aquifer system.

The surficial aquifer generally consists of unconsolidated sands with varying amounts of clay and silt to an approximate depth of 18 feet below land surface (bls). Figures 4A and 4B depict the generalized geology encountered during drilling activities at the site (see appendix C for lithologic logs). Soil borings indicate that the near-surface geology, to a depth of approximately 18 feet bls, consists of brown to gray, fine grained silty sand (SM) and brown to gray, fine grained clayey sand (SC) with some clayey silt and gray, high plasticity clay (MH and CH), with frequent shells and shell fragments. A localized confining layer of silty, high plasticity clay exists at the site at a depth of approximately 18 to 25 feet bls.

Recharge to the surficial aquifer is by way of infiltrating rainwater. The depth to the water table around the perimeter site varied from approximately 1.0 feet to 6.3 below land surface (bls). The general direction of ground-water flow at the site, as determined from water level measurements obtained from monitor wells during the investigation, appears to be towards the St Johns River to the east.

Ground-water level measurements taken during the investigation also indicate a localized mounding of the potentiometric surface beneath the site. This was also mentioned by the two previous studies (G&M, 1987 and E.C. Jordan, 1989). This phenomenon creates a localized radial outward flow of ground water from the site (see figure 5).

Although the shallow rock aquifer was not encountered during drilling at the site, it is described as consisting of permeable deposits of sand, shell, and limestone within and below the Hawthorn Formation (Fairchild, 1972). The general direction of ground-water flow in the shallow rock aquifer is believed to be to the east (Fairchild, 1972).

The Floridan aquifer system is the principal source of fresh water in northeast Florida. It is confined from above by clay units within the Hawthorn Formation. Ground-water flow in the Floridan is thought to be generally toward areas of heavy pumping in Jacksonville. However, a severe depression in the potentiometric surface due to pumping makes it difficult to predict the direction of local flow in the aquifer (Geraghty & Miller, 1985). Very little recharge of the Floridan occurs in the Duval County area. Recharge of the aquifer is from up-dip areas to the west where units of the aquifer are nearer to the surface. The potentiometric surface of the upper Floridan in the vicinity of the facility is approximately 30 feet above mean sea level (Geraghty & Miller, 1985), indicating an upward gradient from the Floridan to the overlying shallower aquifers.

4.0 SITE ASSESSMENT METHODS

4.1 Soil Sampling

A series of 12 shallow soil borings (159-1 through 159-12), 4 feet deep, were drilled on the southwest side of the site (see figure 2) to determine the horizontal and vertical extent of petroleum contamination in the soil. Because of the shallow water table (approx. 2.0 ft bls) and size of the area to be covered, it was decided that soil gas probes would be a more expeditious and thorough method to characterize the soil contamination above the water table. As a result, 53 soil gas probes were executed around the perimeter of Facility 159. Appendix B contains additional information on soil boring and soil gas probe methods. Grab samples from two locations in the drainage ditch surrounding the site were collected for laboratory analysis (see figure 2). The samples were properly preserved, stored on ice, and delivered to Savannah Laboratories and Environmental Services, Inc., Savannah, Georgia, for analysis.

The samples were analyzed for the Florida Kerosene Group (FDER 17-770). Chain of custody was maintained on the samples throughout the sampling period. Procedures for soil sampling are contained in appendix B.

4.2 Monitoring Well Installation

Based on the findings of soil gas survey and headspace analyses, thirteen permanent monitoring wells (JAX-159-GH-1 through JAX-159-GH-13) were installed within and around an area of elevated OVA readings to detect and characterize ground-water contamination at the site.

Monitor well installation procedures are discussed in appendix B. Monitor well installation reports are contained in appendix C. Pertinent data on these permanent monitor wells can also be found in table 2.

4.3 Ground-Water Elevation Survey

The elevation and gradient of the water table were determined by referencing the top of the permanent monitor well casings to a bench mark (BM) established on the deck of the bulk fuel loading dock. This monument is a U.S. Army Corps of Engineers bench mark with an elevation of 8.06 feet above msl.

A water table contour map based on ground-water elevation measurements (see table 2) from the permanent monitor wells, taken on 21 August 1991, is depicted in figure 5. Procedures for ground-water level measurements are contained in appendix B.

TABLE 2

MONITOR WELL
WATER LEVEL DATA

FACILITY 159 - GAS HILL FUEL FARM
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

23 OCTOBER 1991

Well No.	Total Depth of Well bls (ft.)	Top of Casing to Ground Surface (ft.)	Surveyed Top of Casing Elevation (msl) *	Depth to Water from Top of Casing (ft.)	Elevation of Water Table (msl) *
JAX-159-GH-1	10.00	-	10.22	4.94	5.28
JAX-159-GH-2	10.00	-	10.49	4.44	6.05
JAX-159-GH-3	10.00	-	9.58	4.94	4.64
JAX-159-GH-4	10.00	flush	6.56	1.00	5.56
JAX-159-GH-5	10.00	flush	6.87	2.47	4.40
JAX-159-GH-6	11.00	flush	6.79	3.35	3.44
JAX-159-GH-7	10.00	-	5.94	3.11	2.83
JAX-159-GH-8	12.50	-	11.34	6.34	5.00
JAX-159-GH-9	10.00	-	9.25	6.10	3.15
JAX-159-GH-10	10.00	-	8.17	6.19	1.98
JAX-159-GH-11	33.50	flush	7.29	3.28	4.01
JAX-159-GH-12	33.00	flush	7.12	2.60	4.52
JAX-159-GH-13	10.00	-	10.44	5.17	5.27

Notes: - bls = Below Land Surface
- flush = Level with ground surface

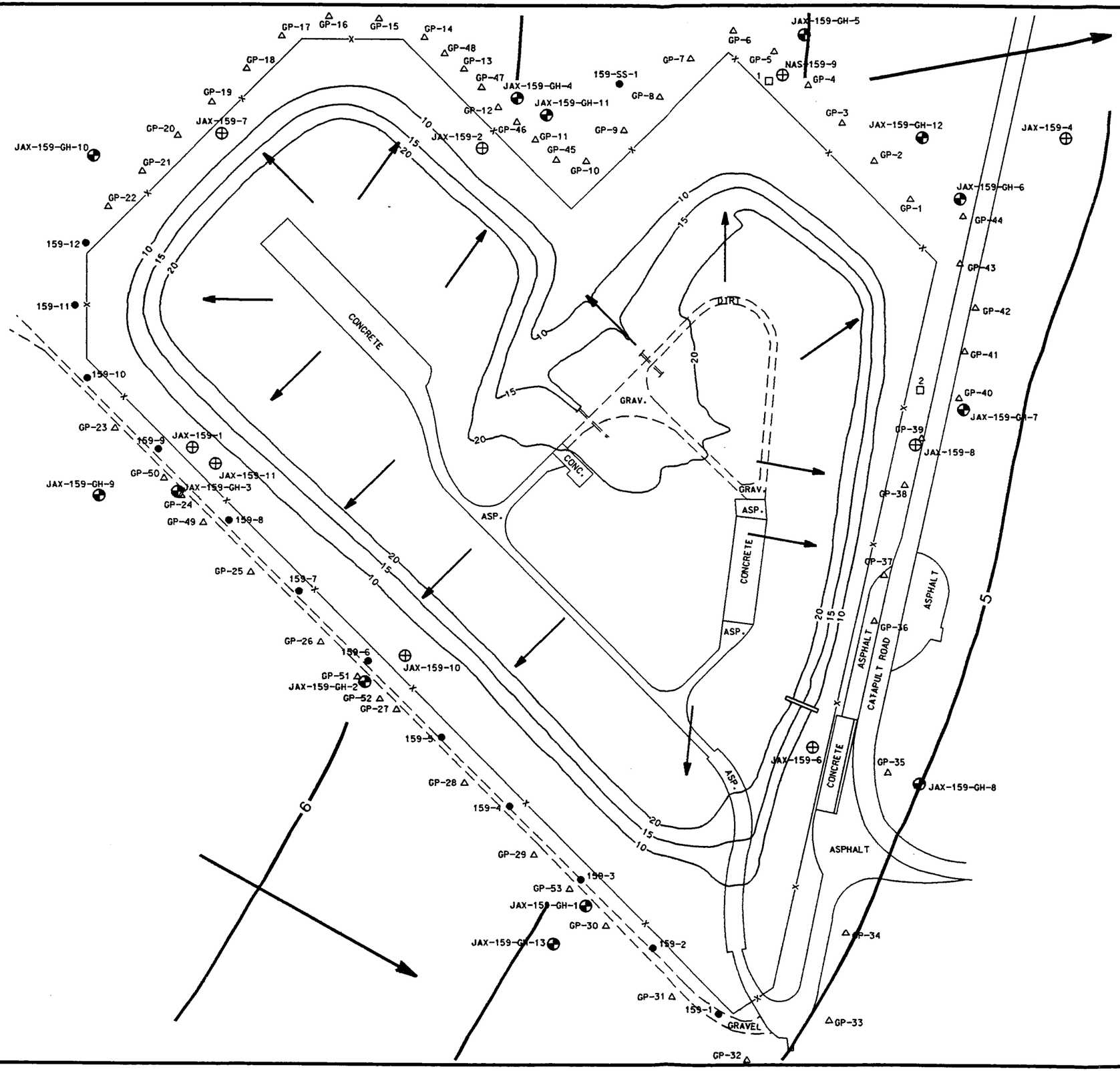

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FIGURE 5

WATER TABLE CONTOURS

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: 1"=100'

4.4 Ground-Water Sampling

Ground-water samples were collected from all thirteen of the permanent monitor wells installed during this contamination assessment. The samples were properly preserved, stored on ice, and delivered to Savannah Laboratories and Environmental Services, Inc., Savannah, Georgia, for analysis.

All monitor well samples were analyzed for the Florida Kerosene Group (FDER 17-770). Chain of custody was maintained on the samples throughout the sampling period. Procedures for monitor well sampling are contained in appendix B.

4.5 Ground-Water Hydraulic Conductivity Testing

Slug tests were conducted on monitoring wells JAX-159-GH-6 and JAX-159-GH-12 to allow estimation of the hydraulic conductivity of the surficial aquifer surrounding the wells. Procedures for conducting slug tests are further discussed in appendix B.

4.6 Tidal Influence Monitoring

Two of the ground-water monitoring wells at the site were monitored over a 24+ hour period (25 - 26 October 1991) to determine the influence on the surficial aquifer at the site from tidal changes in the St. Johns River, approximately 1,000 feet to the east. One Hermit data logger transducer was placed in monitor well JAX-159-GH-6 and another transducer in JAX-159-GH-12 to measure water level changes during two complete tide cycles. The data logger was set to log data at 10-minute intervals. The response of the water level in the wells, recorded with time, is included in appendix D, and the results plotted with the predicted tide is shown in figure 8.

5.0 RESULTS OF CONTAMINATION ASSESSMENT

5.1 Contaminant Plume Delineation and Characterization

Because of the size of the area to be investigated, the history of contamination, and the nature of the operations, the investigation at Facility 159 was initiated with the following supposition: the soils contained within the physical boundaries of Facility 159 are contaminated to some degree. As mentioned previously, the mounding of the potentiometric surface beneath the site further complicates the characterization of subsurface contamination. The main purpose of this investigation was to determine if contamination was leaving the site, and if so, by what means and to what extent. Using this approach, maximum effort was utilized in characterizing the nature and extent of contaminate plumes leaving the site.

The results of the Organic Vapor Analyzer (OVA) analyses of soil samples taken during contamination assessment are shown in table 3. These analyses indicated areas of soil contamination with significantly elevated OVA readings corresponding to the areas of contamination discovered in 1982, mentioned earlier, as shown in figure 3. This is also verified by the numerous soil gas probes executed in this vicinity. The physical appearance and the nature of the seepage in the embankment would indicate past leaking from one or more of the tanks in this area of the facility. Headspace borings 159-8 through 159-11 and monitor well JAX-159-GH-3 exhibited moderate to very strong fuel odors with some visual indications of residual hydrocarbons in the capillary zone above the water table. Three soil samples obtained from headspace borings (159-9, 159-10, and 159-11) exceeded the criterion for "excessively contaminated soil" (OVA results > 50 ppm for kerosene group contaminants) as defined in Chapter 17-770.200(2).

The OVA headspace analyses, soil gas probes, and the results of the grab sample analysis from the ditches, plotted in figure 6, indicate that soil contamination greater than 10 ppm is located predominantly at the west edge of the facility near the area of surface seepage and in the ditches surrounding the compound.. The ditch contamination is believed to be primarily due to surface runoff from the 1988 overflow spill. The surface seepage does appear to be a contributing factor to the ditch contamination, especially in the areas on the north side of the compound (see figure 3).

A summary of laboratory analytical results for ground-water samples is presented in table 5 and soil samples in table 6. A complete copy of laboratory analytical results and chain-of-custody documentation is contained in appendix E. The ground-water analyses indicated all wells to be below detection limits (BDL) for purgeable aromatics (602/8020), except JAX-159-GH-1, JAX-159-GH-2, JAX-159-GH-8, and JAX-159-GH-13, which had

detectable amounts of benzene, ethylbenzene, toluene, xylenes, and methyl-tert-butyl-ether (MTBE). The regulatory standard for benzene was exceeded in JAX-159-GH-1, JAX-159-GH-8, and JAX-159-GH-13. The presence of benzene in JAX-159-GH-8 at 4.9µg/l is believed to be from a source other than the tanks themselves. JAX-159-GH-8 is approximately 80 feet down-gradient (figure 7) from a concrete containment pad that previously was used to load tank trucks with product for distribution. It is believed that various small incidents (i.e., spillage, overtopping, etc.) during the operation of this loading facility have produced the minor contamination detected in the sampling at that location.

Various naphthalenes were found in JAX-159-GH-3 and total naphthalenes in that well exceeded regulatory limits (138µg/l). Two PAHs (acenaphthene and acenaphthylene) were detected in JAX-159-GH-3 at 22 and 25µg/l, respectively.

Total lead was found above the regulatory standard of 0.05 ppm in all the shallow wells sampled. However, the field sampling methodology did not include filtering of samples so, these values indicate the level of disolved and suspended lead. The two deep wells (JAX-159-GH-11 and JAX-159-GH-12) had lead concentrations below detection limits.

The approximate horizontal extent of ground-water contamination, based on laboratory analytical results of samples from monitor wells, is indicated on figure 7. The approximate vertical extent of contamination, as defined by deep wells JAX-159-GH-11 and JAX-159-GH-12, appears to be no deeper than 25.0 feet bls.

Specific conductance measured in the field, as well as laboratory analysis of total dissolved solids, confirms that ground water from the shallow surficial aquifer surrounding the site is Class G-II as defined by Chapter 17-3.403, FAC.

TABLE 3

SUMMARY OF SOIL HEADSPACE ANALYSES

FACILITY 159 - GAS HILL FUEL FARM
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Sample No.	Depth (feet)	OVA Headspace Reading	OVA Headspace Reading With Carbon Filter	Corrected OVA Headspace Reading (*)	PID Reading
159-1	1.0-1.5	4.4	NR	–	0
159-2	1.0-1.5	0.2	NR	–	0
159-3	1.0-1.5	0.6	NR	–	0
159-4	1.0-1.5	1.5	NR	–	0
159-5	1.0-1.5	460	NR	–	0
159-6	1.0-1.5	15	NR	–	6.1
159-7	1.0-1.5	3.9	NR	–	3.3
159-8	1.0-1.5	28***	NR	–	4.2
159-9	1.0-1.5	270***	NR	–	19.3
159-10	1.0-1.5	295***	NR	–	8.6
159-11	1.0-1.5	510***	NR	–	12.8
159-12	1.0-1.5	1.2	NR	–	9.3
JAX-159-GH-1	1.0-1.5	80	NR	–	1.4
JAX-159-GH-2	1.0-1.5	0.2	NR	–	1.0
JAX-159-GH-3	1.5-2.0	20***	NR	–	9.7
JAX-159-GH-4	1.5-2.0	350	NR	–	2.0
JAX-159-GH-5	1.0-1.5	1.2	NR	–	1.3
JAX-159-GH-6	1.0-1.5	0.6	NR	–	1.3
JAX-159-GH-7	1.0-1.5	0.4	NR	–	1.0
JAX-159-GH-8	1.0-1.5	0	NR	–	2.2
JAX-159-GH-9	1.0-1.5	0.5	NR	–	2.0
JAX-159-GH-10	1.0-1.5	2.9	NR	–	13
JAX-159-GH-11	1.0-1.5	1.8	NR	–	4.2
JAX-159-GH-12	1.0-1.5	0	NR	–	2.6
JAX-159-GH-13	1.0-1.5	2.4	NR	–	716

Notes:
- All units in parts per million (ppm)
- NR = Not Recorded
- OVA = Organic Vapor Analyzer (Century OVA-128)
- (*) = Difference between OVA reading without carbon filter and OVA reading with carbon filter
- PID = Photo-ionizing Device (Thermo-Ennvironmental OVM or Photo-vac Micro-tip)
- (***)= petroleum odor

TABLE 4

SUMMARY OF SOIL GAS SURVEY

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Date	Probe No.	Sample No.	Depth (feet)	OVA Reading	PID Reading	Comments
9/5/91	GP-1	1	0.0 - 0.5	3.8	NR	
"	"	2	0.5 - 1.0	5.7	NR	
"	"	3	1.0 - 1.5	10.2	NR	
"	"	4	1.5 - 2.0	1.4	NR	
"	"	5	2.0 - 2.5	1000+	NR	2.5' water
"	GP-2	1	0.0 - 0.5	4.6	NR	
"	"	2	0.5 - 1.0	3.6	NR	
"	"	3	1.0 - 1.5	12.0	NR	
"	"	4	1.5 - 2.0	8.0	NR	
"	"	5	2.0 - 2.5	1.2	NR	2.5' water
"	GP-3	1	0.0 - 0.5	0.6	NR	
"	"	2	0.5 - 1.0	3.8	NR	
"	"	3	1.0 - 1.5	0	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-4	1	0.0 - 0.5	2.4	NR	
"	"	2	0.5 - 1.0	0	NR	
"	"	3	1.0 - 1.5	NR	NR	1.5' water
"	GP-5	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	0	NR	
"	"	3	1.0 - 1.5	0	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-6	1	0.0 - 0.5	3.0	NR	
"	"	2	0.5 - 1.0	0	NR	
"	"	3	1.0 - 1.5	NR	NR	1.5' water
"	GP-7	1	0.0 - 0.5	150	NR	
"	"	2	0.5 - 1.0	165	NR	
"	"	3	1.0 - 1.5	80	NR	
"	"	4	1.5 - 2.0	15	NR	1.5' water
"	GP-8	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	6.9	NR	
"	"	3	1.0 - 1.5	1000+	NR	methane?
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-9	1	0.0 - 0.5	25	NR	
"	"	2	0.5 - 1.0	86	NR	
"	"	3	1.0 - 1.5	820	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-10	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	0	NR	
"	"	3	1.0 - 1.5	0	NR	1.5' water
"	GP-11	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	4.6	NR	
"	"	3	1.0 - 1.5	25	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-12	1	0.0 - 0.5	550	NR	
"	"	2	0.5 - 1.0	120	NR	
"	"	3	1.0 - 1.5	1000+	NR	1.5' water methane?

TABLE 4 (CON'T)

SUMMARY OF SOIL GAS SURVEY

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Date	Probe No.	Sample No.	Depth (feet)	OVA Reading	PID Reading	Comments
9/5/91	GP-13	1	0.0 - 0.5	0.4	NR	
"	"	2	0.5 - 1.0	NR	NR	
"	"	3	1.0 - 1.5	NR	NR	1.0' water
"	GP-14	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	8.2	NR	
"	"	3	1.0 - 1.5	4.0	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-15	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	0	NR	
"	"	3	1.0 - 1.5	0	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-16	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	0	NR	
"	"	3	1.0 - 1.5	0	NR	1.5' water
9/6/91	GP-17	1	0.0 - 0.5	3.8	NR	
"	"	2	0.5 - 1.0	4.6	NR	
"	"	3	1.0 - 1.5	10.0	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-18	1	0.0 - 0.5	2.8	NR	
"	"	2	0.5 - 1.0	2.2	NR	
"	"	3	1.0 - 1.5	140	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-19	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	110	NR	
"	"	3	1.0 - 1.5	660	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-20	1	0.0 - 0.5	0.4	NR	
"	"	2	0.5 - 1.0	0.4	NR	
"	"	3	1.0 - 1.5	12	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-21	1	0.0 - 0.5	1.2	NR	
"	"	2	0.5 - 1.0	11.5	NR	
"	"	3	1.0 - 1.5	32	NR	
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-22	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	1.4	NR	
"	"	3	1.0 - 1.5	110	NR	
"	"	4	1.5 - 2.0	1000+	NR	
"	"	5	2.0 - 2.5	NR	NR	2.0' water
"	GP-23	1	0.0 - 0.5	240	NR	
"	"	2	0.5 - 1.0	1000+	NR	
"	"	3	1.0 - 1.5	340	NR	1.0' water
"	GP-24	1	0.0 - 0.5	1.2	NR	
"	"	2	0.5 - 1.0	1000+	NR	strong fuel odor
"	"	3	1.0 - 1.5	1000+	NR	"
"	"	4	1.5 - 2.0	NR	NR	1.5' water

TABLE 4 (CON'T)

SUMMARY OF SOIL GAS SURVEY

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Date	Probe No.	Sample No.	Depth (feet)	OVA Reading	PID Reading	Comments
9/6/91	GP-25	1	0.0 - 0.5	6.5	NR	
"	"	2	0.5 - 1.0	300	NR	methane?
"	"	3	1.0 - 1.5	NR	NR	1.0' water
"	GP-26	1	0.0 - 0.5	2.6	NR	
"	"	2	0.5 - 1.0	18	NR	
"	"	3	1.0 - 1.5	12	NR	1.0' water
"	GP-27	1	0.0 - 0.5	0	NR	
"	"	2	0.5 - 1.0	180	NR	
"	"	3	1.0 - 1.5	1000+	NR	methane?
"	"	4	1.5 - 2.0	1000+	NR	methane?
"	"	5	2.0 - 2.5	NR	NR	2.0' water
"	GP-28	1	0.0 - 0.5	300	NR	
"	"	2	0.5 - 1.0	1000+	NR	methane?
"	"	3	1.0 - 1.5	1000+	NR	methane?
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-29	1	0.0 - 0.5	6.0	NR	
"	"	2	0.5 - 1.0	1000+	NR	methane?
"	"	3	1.0 - 1.5	1000+	NR	1.5' water
"	GP-30	1	0.0 - 0.5	120	NR	
"	"	2	0.5 - 1.0	1000+	NR	methane?
"	"	3	1.0 - 1.5	1000+	NR	methane?
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-31	1	0.0 - 0.5	125	NR	
"	"	2	0.5 - 1.0	1000+	NR	methane?
"	"	3	1.0 - 1.5	NR	NR	1.0' water
"	GP-32	1	0.0 - 0.5	180	NR	
"	"	2	0.5 - 1.0	1000+	NR	methane?
"	"	3	1.0 - 1.5	NR	NR	1.0' water
9/9/91	GP-33	1	0.0 - 0.5	3.2	NR	
"	"	2	0.5 - 1.0	1000+	NR	methane?
"	"	3	1.0 - 1.5	600	NR	methane?
"	"	4	1.5 - 2.0	NR	NR	1.7' water
"	GP-34	1	0.0 - 0.5	13	NR	
"	"	2	0.5 - 1.0	140	NR	
"	"	3	1.0 - 1.5	1000+	NR	methane?
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-35	1	0.0 - 0.5	60	NR	
"	"	2	0.5 - 1.0	1000+	NR	methane?
"	"	3	1.0 - 1.5	NR	NR	1.0' water
9/10/91	GP-36	1	0.0 - 0.5	1.8	NR	
"	"	2	0.5 - 1.0	NR	NR	
"	"	3	1.0 - 1.5	1000+	5.2	methane
"	"	4	1.5 - 2.0	NR	35.1	1.5' water
"	GP-37	1	0.0 - 0.5	220	4.6	methane
"	"	2	0.5 - 1.0	NR	NR	0.3' water

TABLE 4 (CON'T)

SUMMARY OF SOIL GAS SURVEY

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Date	Probe No.	Sample No.	Depth (feet)	OVA Reading	PID Reading	Comments
9/10/91	GP-38	1	0.0 - 0.5	0.2	NR	
"	"	2	0.5 - 1.0	1000+	3.8	methane
"	"	3	1.0 - 1.5	1000+	4.0	methane
"	"	4	1.5 - 2.0	1000+	3.7	methane
"	"	5	2.0 - 2.5	NR	4.1	2.0' water
"	GP-39	1	0.0 - 0.5	18	4.1	
"	"	2	0.5 - 1.0	12	3.8	
"	"	3	1.0 - 1.5	0.4	0	
"	"	4	1.5 - 2.0	0.9	NR	1.5' water
"	GP-40	1	0.0 - 0.5	0.9	3.8	
"	"	2	0.5 - 1.0	1.2	3.9	
"	"	3	1.0 - 1.5	1000+	4.3	methane
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-41	1	0.0 - 0.5	1.8	3.7	
"	"	2	0.5 - 1.0	1000+	3.8	methane
"	"	3	1.0 - 1.5	NR	3.8	1.0' water
"	GP-42	1	0.0 - 0.5	0.4	NR	
"	"	2	0.5 - 1.0	0.4	0.4	
"	"	3	1.0 - 1.5	320	3.4	methane
"	"	4	1.5 - 2.0	NR	NR	1.5' water
"	GP-43	1	0.0 - 0.5	0.2	NR	
"	"	2	0.5 - 1.0	1.8	3.2	
"	"	3	1.0 - 1.5	14.5	4.1	
"	"	4	1.5 - 2.0	22	4.3	
"	"	5	2.0 - 2.5	NR	NR	2.0' water
"	GP-44	1	0.0 - 0.5	2.5	3.8	
"	"	2	0.5 - 1.0	4.2	3.8	
"	"	3	1.0 - 1.5	30	4.1	
"	"	4	1.5 - 2.0	100	4.1	
"	"	5	2.0 - 2.5	NR	NR	2.0' water
9/13/91	GP-45	1	0.0 - 0.5	0	0	
"	"	2	0.5 - 1.0	0.4	15	
"	"	3	1.0 - 1.5	1.2	15.9	
"	"	4	1.5 - 2.0	10	15.3	2.0' water
"	GP-46	1	0.0 - 0.5	0	4.8	
"	"	2	0.5 - 1.0	0	4.8	
"	"	3	1.0 - 1.5	11	4.2	
"	"	4	1.5 - 2.0	120	4.3	2.0' water
"	GP-47	1	0.0 - 0.5	9.9	5.1	
"	"	2	0.5 - 1.0	10.5	3.8	
"	"	3	1.0 - 1.5	620	5.0	methane
"	"	4	1.5 - 2.0	800	NR	2.0' water
"	GP-48	1	0.0 - 0.5	0	3.9	
"	"	2	0.5 - 1.0	1.0	4.4	
"	"	3	1.0 - 1.5	10	4.0	
"	"	4	1.5 - 2.0	NR	7.1	2.0' water

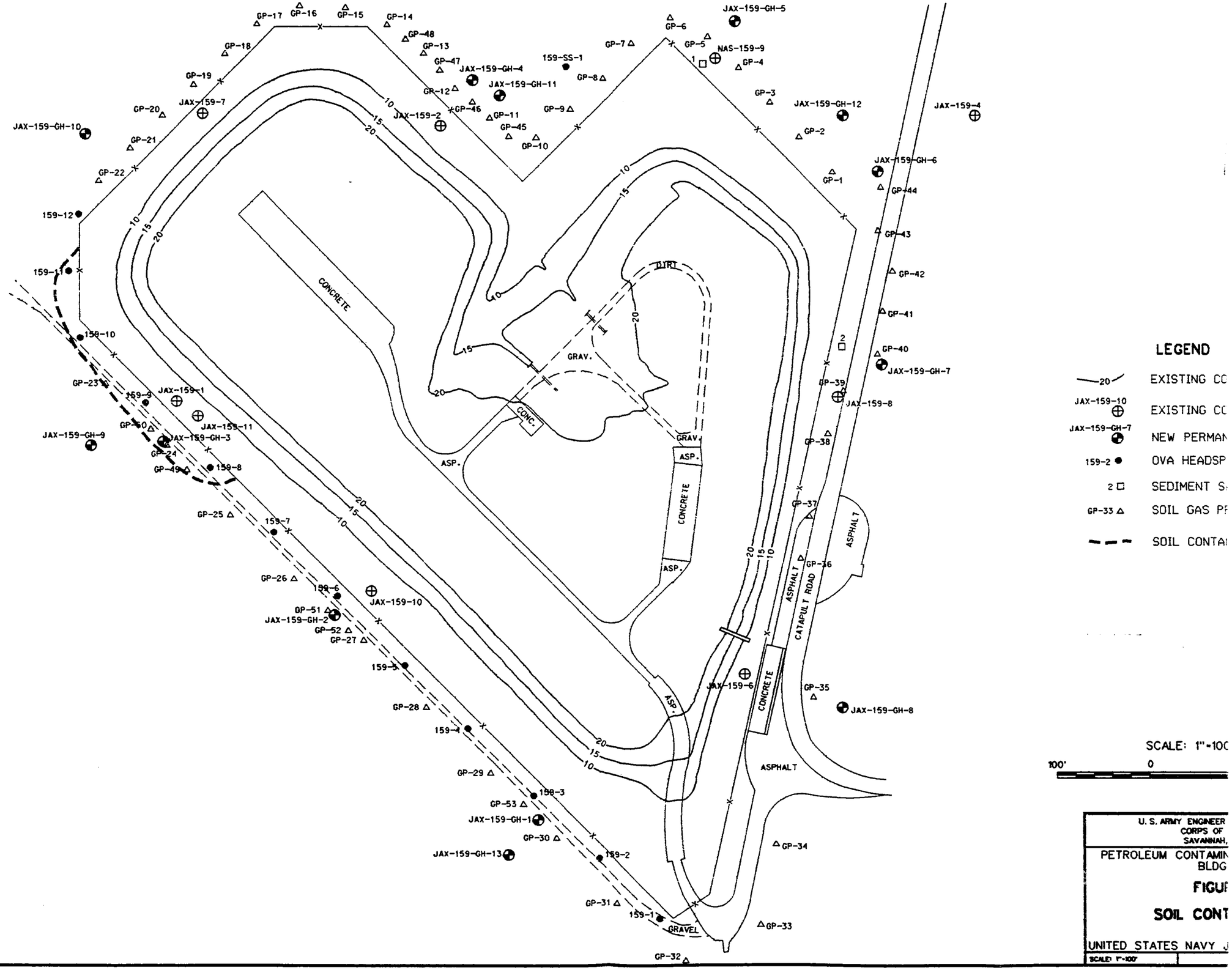
TABLE 4 (CON'T)

SUMMARY OF SOIL GAS SURVEY

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Date	Probe No.	Sample No.	Depth (feet)	OVA Reading	PID Reading	Comments
9/13/91	GP-49	1	0.0 - 0.5	25	4.9	
"	"	2	0.5 - 1.0	350	5.2	
"	"	3	1.0 - 1.5	1000+	6.2	methane
"	"	4	1.5 - 2.0	NR	6.4	1.7' water
"	GP-50	1	0.0 - 0.5	45	4.9	
"	"	2	0.5 - 1.0	650	7.8	
"	"	3	1.0 - 1.5	1000+	5.5	methane
"	"	4	1.5 - 2.0	1000+	7.0	2.0' water
"	GP-51	1	0.0 - 0.5	1.2	4.8	
"	"	2	0.5 - 1.0	3.5	4.4	
"	"	3	1.0 - 1.5	11	4.9	
"	"	4	1.5 - 2.0	NR	NR	1.3' water
"	GP-52	1	0.0 - 0.5	550	4.4	
"	"	2	0.5 - 1.0	1000+	4.5	methane
"	"	3	1.0 - 1.5	NR	4.0	1.2' water
"	GP-53	1	0.0 - 0.5	65	5.0	
"	"	2	0.5 - 1.0	1000+	4.3	methane
"	"	3	1.0 - 1.5	1000+	4.6	methane
"	"	4	1.5 - 2.0	1000+	4.0	1.6' water

Notes:
- All units in parts per million (ppm)
- NR = Not Recorded
- OVA = Organic Vapor Analyzer (Century OVA-128)
- PID = Photo-ionizing Device (Thermo-Ennvironmental OVM or Photo-vac Micro-tip)


GP-17
GP-16
GP-15
GP-14
GP-48
GP-13
GP-47
GP-18
GP-19
GP-20
GP-21
GP-22
JAX-159-GH-10
JAX-159-7
JAX-159-GH-4
JAX-159-GH-11
JAX-159-2
159-SS-1
GP-8
GP-12
GP-46
GP-11
GP-45
GP-10
GP-9
GP-7
GP-6
GP-5
NAS-159-9
GP-4
GP-3
JAX-159-GH-5
JAX-159-GH-12
JAX-159-4
GP-2
GP-1
JAX-159-GH-6
GP-44
GP-43
GP-42
GP-41
GP-40
JAX-159-GH-7
GP-39
JAX-159-8
GP-38
GP-37
GP-36
GP-35
JAX-159-GH-8
GP-34
GP-33
GP-32
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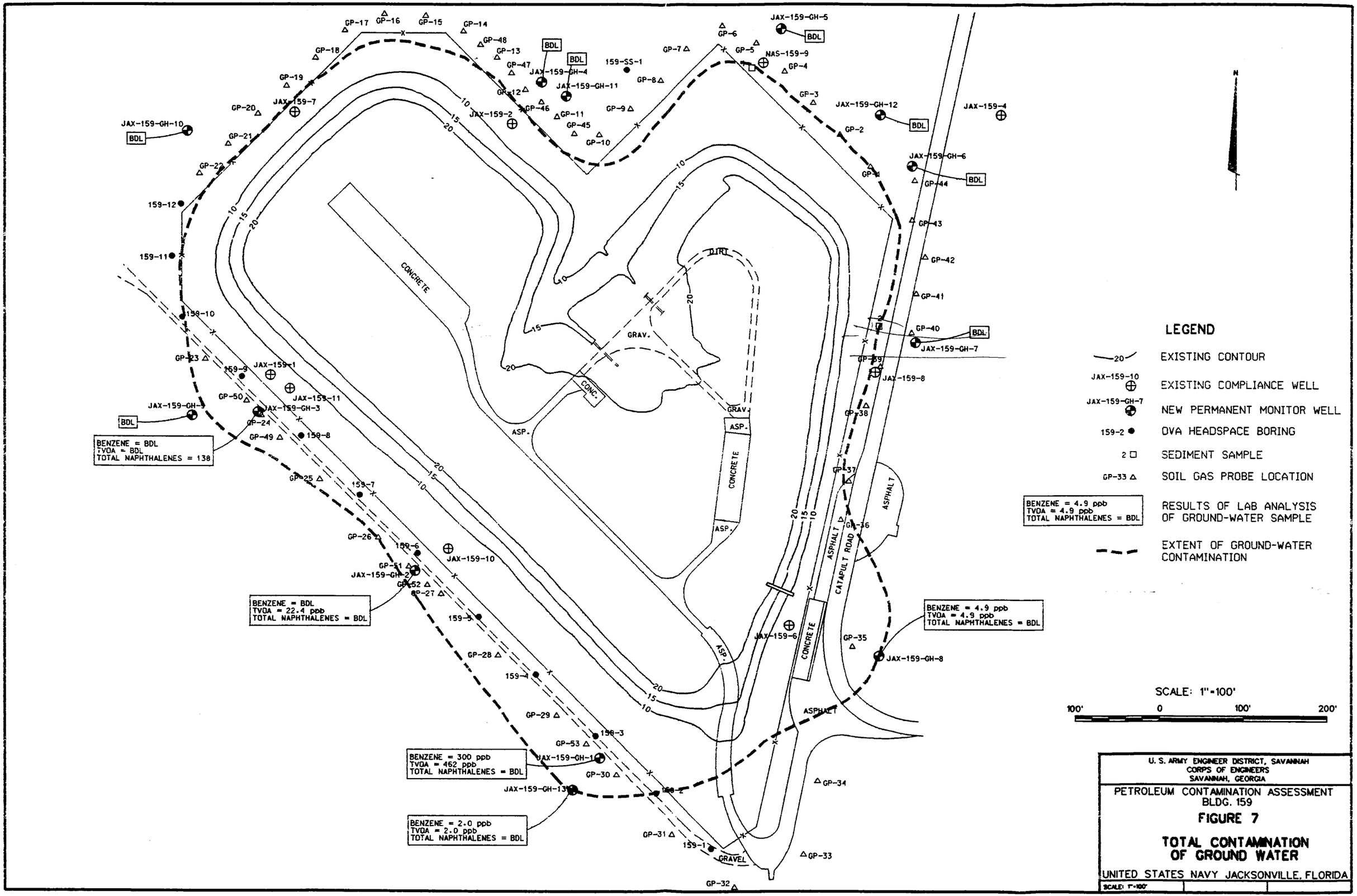
159-12
159-11
159-10
159-9
159-8
159-7
159-6
159-5
159-4
159-3
159-2
159-1
JAX-159-1
JAX-159-11
JAX-159-GH-3
JAX-159-GH-9
JAX-159-10
JAX-159-GH-2
JAX-159-GH-1
JAX-159-GH-13
JAX-159-6
CONCRETE
ASP.
GRAV.
DIRT
CONC.
ASPHALT
CATAPULT ROAD
GRAVEL
10
15
20
LEGEND
20 EXISTING CC
JAX-159-10 EXISTING CC
JAX-159-GH-7 NEW PERMAN
159-2 OVA HEADSP
2 SEDIMENT S
GP-33 SOIL GAS PF
SOIL CONTAI
SCALE: 1"=100
100'
0
U. S. ARMY ENGINEER
CORPS OF
SAVANNAH,
PETROLEUM CONTAMIN
BLDG
FIGUI
SOIL CONT
UNITED STATES NAVY J
SCALE: 1"=100'



U. S. ARMY ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PETROLEUM CONTAMINATION ASSESSMENT
BLDG. 159

FIGURE 7

TOTAL CONTAMINATION OF GROUND WATER

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: 1"=100'

RF=J:\ENG\SMITH\JAX159\SITEPLANLDGN-10,11,60
RF=J:\ENG\SMITH\JAX159\1117BOR.DGN J:\ENG\SMITH\JAX159\CWCONLDGN

TABLE 5

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

10 JANUARY 1992

PARAMETER	MONITOR WELL NUMBER									
	JAX-159 GH-1	JAX-159 GH-2	JAX-159 GH-3	JAX-159 GH-4	JAX-159 GH-5	JAX-159 GH-6	JAX-159 GH-6 DUP.	JAX-159 GH-7	JAX-159 GH-8	Regulatory Standard
Purgeable Halocarbons (601/8010)										
Bromodichloromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Bromoform, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Bromoethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Carbon Tetrachloride, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
2-Chloroethylvinyl Ether, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chloroform, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chloromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dibromochloromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,2-Dichlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,3-Dichlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,4-Dichlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dichlorodifluoromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1-Dichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,2-Dichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1-Dichloroethene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	3
cis/trans-1,2-Dichloroethylene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,2-Dichloropropane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Cis-1,3-Dichloropropene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Trans-1,3-Dichloropropene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Methyline Chloride, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1,2,2-Tetrachloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Tetrachloroethene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1,1-Trichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1,2-Trichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Trichloroethene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Trichlorofluoromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	

TABLE 5

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

10 JANUARY 1992

MONITOR WELL NUMBER

PARAMETER	JAX-159 GH-1	JAX-159 GH-2	JAX-159 GH-3	JAX-159 GH-4	JAX-159 GH-5	JAX-159 GH-6	JAX-159 GH-6 DUP.	JAX-159 GH-7	JAX-159 GH-8	Regulatory Standard
Vinyl Chloride, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Purgeable Aromatics (602/8020)										
Benzene, ug/l	300	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4.9	1
Ethylbenzene, ug/l	61	7.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Toluene, ug/l	13	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Xylenes, ug/l	88	14	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Methyl-Tert-Butyl-Ether (MTBE), ug/l	39	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	50
Total Volatile Organic Aromatics, ug/l	462	22.4	BDL	BDL	BDL	BDL	BDL	BDL	4.9	50
1,2-Dibromoethane (EDB), ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.02
Lead, mg/l	0.15	0.23	0.066	0.054	0.2	0.082	0.082	3.8	0.69	0.05
Polynuclear Aromatic Hydrocarbons (8100)										
Acenaphthene, ug/l	BDL**	BDL	22	BDL	BDL	BDL	BDL	BDL	BDL	
Acenaphthylene, ug/l	BDL**	BDL	25	BDL	BDL	BDL	BDL	BDL	BDL	
Benzo (a) pyrene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Benzo (g,h,i) perylene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Benzo (b,k) fluoranthene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chrysene + Benzo (a) anthracene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Fluoranthene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Fluorene, ug/l	BDL**	BDL	40	BDL	BDL	BDL	BDL	BDL	BDL	
Indeno (1,2,3-cd) pyrene+Dibenzo (a,h) anthracene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Naphthalene, ug/l	BDL**	BDL	19	BDL	BDL	BDL	BDL	BDL	BDL	
Phenanthrene + Anthracene, ug/l	BDL**	BDL	39	BDL	BDL	BDL	BDL	BDL	BDL	
Pyrene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
2-Methylnaphthalene, ug/l	BDL**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1-Methylnaphthalene, ug/l	BDL**	BDL	80	BDL	BDL	BDL	BDL	BDL	BDL	
Total Naphthalenes, ug/l	BDL	BDL	136	BDL	BDL	BDL	BDL	BDL	BDL	100

TABLE 5

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

10 JANUARY 1992

PARAMETER	MONITOR WELL NUMBER									
	JAX-159 GH-1	JAX-159 GH-2	JAX-159 GH-3	JAX-159 GH-4	JAX-159 GH-5	JAX-159 GH-6	JAX-159 GH-6 DUP.	JAX-159 GH-7	JAX-159 GH-8	Regulatory Standard
Petroleum Hydrocarbons (418.1), mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5
Total Dissolved Solids, mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Chloride (325.2), mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Notes: - BDL = Below Detection Limit
- ** = These parameters had elevated detection limits possibly due to analytical interference
- NA = Not Analyzed
- Shaded values indicate value exceeds regulatory standard

TABLE 5 (CONTINUED)

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

9 JANUARY 1992

PARAMETER	MONITOR WELL NUMBER								
	JAX-159 GH-9	JAX-159 GH-10	JAX-159 GH-11	JAX-159 GH-12	JAX-159 GH-13	RINSATE BLANK	FIELD BLANK	TRIP BLANK	Regulatory Standard
Purgeable Halocarbons (601/8010)									
Bromodichloromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Bromoform, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Bromoethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Carbon Tetrachloride, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
2-Chloroethylvinyl Ether, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chloroform, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chloromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dibromochloromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,2-Dichlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,3-Dichlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,4-Dichlorobenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dichlorodifluoromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1-Dichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,2-Dichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1-Dichloroethene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	3
cis/trans-1,2-Dichloroethylene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,2-Dichloropropane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Cis-1,3-Dichloropropene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Trans-1,3-Dichloropropene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Methyline Chloride, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1,2,2-Tetrachloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Tetrachloroethene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1,1-Trichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1,2-Trichloroethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Trichloroethene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Trichlorofluoromethane, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	

TABLE 5 (CONTINUED)

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

9 JANUARY 1992

PARAMETER	MONITOR WELL NUMBER								
	JAX-159 GH-9	JAX-159 GH-10	JAX-159 GH-11	JAX-159 GH-12	JAX-159 GH-13	RINSATE BLANK	FIELD BLANK	TRIP BLANK	Regulatory Standard
Vinyl Chloride, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Purgeable Aromatics (602/8020)									
Benzene, ug/l	BDL	BDL	BDL	BDL	2.00	BDL	BDL	BDL	1
Ethylbenzene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Toluene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Xylenes, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Methyl-Tert-Butyl-Ether (MTBE), ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	50
Total Volatile Organic Aromatics, ug/l	BDL	BDL	BDL	BDL	2.00	BDL	BDL	BDL	50
1,2-Dibromoethane (EDB), ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.02
Total Lead, mg/l	0.12	0.19	BDL	BDL	0.29	BDL	BDL	BDL	0.05
Polynuclear Aromatic Hydrocarbons (8100)									
Acenaphthene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Acenaphthylene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Benzo (a) pyrene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Benzo (g,h,i) perylene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Benzo (b,k) fluoranthene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chrysene + Benzo (a) anthracene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Fluoranthene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Fluorene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Indeno (1,2,3-cd) pyrene+Dibenzo (a,h) anthracene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Naphthalene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Phenanthrene + Anthracene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Pyrene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
2-Methylnaphthalene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1-Methylnaphthalene, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Total Naphthalenes, ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	100

TABLE 5 (CONTINUED)

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

9 JANUARY 1992

PARAMETER	MONITOR WELL NUMBER								
	JAX-159 GH-9	JAX-159 GH-10	JAX-159 GH-11	JAX-159 GH-12	JAX-159 GH-13	RINSATE BLANK	FIELD BLANK	TRIP BLANK	Regulatory Standard
Petroleum Hydrocarbons (418.1), mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5
Total Dissolved Solids, mg/l	NA	NA	NA	NA	NA	NA	NA	NA	
Chloride (325.2), mg/l	NA	NA	NA	NA	NA	NA	NA	NA	

Notes: - BDL = Below Detection Limit
- ** = These parameters had elevated detection limits possibly due to analytical interference
- NA = Not Analyzed
- Shaded values indicate value exceeds regulatory standard
- DL (10) = Detection Limit (in this case 10 ppb)

TABLE 6

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

9 JANUARY 1992

SOLID OR SEMISOLID SAMPLES

PARAMETER	JAX-159 GRAB-1	JAX-159 GRAB-2							Regulatory Standard
Percent Solids, %	74	57							
Polynuclear Aromatic Hydrocarbons (610/8100)									
Acenaphthene, ug/kg dw	BDL	1800							
Acenaphthylene, ug/kg dw	BDL	880							
Benzo (a) pyrene, ug/kg dw	380	6900							
Benzo (g,h,i) perylene, ug/kg dw	BDL	BDL							
Benzo (b,k) fluoranthene, ug/kg dw	360	7100							
Chrysene + Benzo (a) Anthracene, ug/kg dw	BDL	2700							
Fluoranthene, ug/kg dw	BDL	470							
Fluorene, ug/kg dw	BDL	BDL							
Indeno (1,2,3-cd) pyrene+Dibenzo (a,h) anthracene, ug/l	670	1700							
Naphthalene, ug/kg dw	BDL	BDL							
Phenanthrene + Anthracene, ug/kg dw	BDL	BDL							
Pyrene, ug/kg dw	BDL	600							
2-Methylnaphthalene, ug/kg dw	BDL	380							
1-Methylnaphthalene, ug/kg dw	BDL	360							
Lead, mg/kg dw	2	610							
Halogenated Volatiles (8010)									
Benzyl Chloride, ug/kg dw	BDL	BDL							
Bromobenzene, ug/kg dw	BDL	BDL							
Bromodichloromethane, ug/kg dw	BDL	BDL							
Bromoform, ug/kg dw	BDL	BDL							
Bromomethane, ug/kg dw	BDL	BDL							
Carbon Tetrachloride, ug/kg dw	BDL	BDL							
Chlorobenzene, ug/kg dw	BDL	BDL							
Chloroethane, ug/kg dw	BDL	BDL							
Chloroform, ug/kg dw	BDL	BDL							
1-Chlorohexane, ug/kg dw	BDL	BDL							

TABLE 6

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

9 JANUARY 1992

SOLID OR SEMISOLID SAMPLES

PARAMETER	JAX-159 GRAB-1	JAX-159 GRAB-2							Regulatory Standard
2-Chloroethylvinyl Ether, ug/kg dw	BDL	BDL							
Chloromethane, ug/kg dw	BDL	BDL							
Chlorotoluene, ug/kg dw	BDL	BDL							
Dibromochloromethane, ug/kg dw	BDL	BDL							
Dibromomethane, ug/kg dw	BDL	BDL							
1,2 - Dichlorobenzene, ug/kg dw	BDL	BDL							
1,3 - Dichlorobenzene, ug/kg dw	BDL	BDL							
1,4 - Dichlorobenzene, ug/kg dw	BDL	BDL							
Dichlorodifluoromethane, ug/kg dw	BDL	BDL							
1,1- Dichloroethane, ug/kg dw	BDL	BDL							
1,2 - Dichloroethane, ug/kg dw	BDL	BDL							
1,1 - Dichloroethane, ug/kg dw	BDL	BDL							
cis/trans - 1,2 - Dichloroethylene, ug/kg dw	BDL	BDL							
Dichloromethane, ug/kg dw	BDL	BDL							
1,2 - Dichloropropane, ug/kg dw	BDL	BDL							
1,3 - Dichloropropylene, ug/kg dw	BDL	BDL							
1,1,2,2 - Tetrachloroethane, ug/kg dw	BDL	BDL							
1,1,1,2 - Tetrachloroethane, ug/kg dw	BDL	BDL							
Tetrachloroethane, ug/kg dw	BDL	BDL							
1,1,1, - Trichloroethane, ug/kg dw	BDL	BDL							
1,1,2 - Trichloroethane, ug/kg dw	BDL	BDL							
Trichloroethene, ug/kg dw	BDL	BDL							
Trichlorofluoromethane, ug/kg dw	BDL	BDL							
1,2,3 - Trichloropropane, ug/kg dw	BDL	BDL							
Vinyl Chloride, ug/kg dw	BDL	BDL							
Aromatic Volatiles (8020)									
Benzene, ug/kg dw	BDL	BDL							
Chlorobenzene, ug/kg dw	BDL	BDL							
1,2 - Dichlorobenzene, ug/kg dw	BDL	BDL							

TABLE 6

SUMMARY OF GROUND-WATER ANALYTICAL RESULTS

BUILDING 159
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

9 JANUARY 1992

SOLID OR SEMISOLID SAMPLES

PARAMETER	JAX-159 GRAB-1	JAX-159 GRAB-2							Regulatory Standard
1,3 - Dichlorobenzene, ug/kg dw	BDL	BDL							
1,4 - Dichlorobenzene, ug/kg dw	BDL	BDL							
Ethylbenzene, ug/kg dw	BDL	BDL							
Toluene, ug/kg dw	BDL	BDL							
Xylenes, ug/kg dw	BDL	BDL							
Methyl Tert Butyl Ether (MBTE), ug/kg	BDL	BDL							

Notes: - BDL = Below Detection Limit
- ** = These parameters had elevated detection limits possibly due to analytical interference
- NA = Not Analyzed
- Shaded values indicate value exceeds regulatory standard

5.2 Field Ground-Water Quality Parameters

Water quality parameters measured in the field at the time of monitor well sampling indicate that pH ranged from 6.52 to 7.91, specific conductance ranged from 398 to 2290 umhos/cm, and temperature ranged from 16.7 to 21.4 degrees Celsius. A summary of field water quality parameters for the thirteen wells sampled is presented in table 7.

5.3 Ground-Water Hydraulic Conductivity Testing Results

The results of slug test analyses indicate an average shallow subsurface horizontal hydraulic conductivity of 17.3 ft/day. The hydraulic gradient at the site was determined to be 0.0016. The average pore water velocity (V) was calculated to be 0.1 ft/day. Transmissivity (T) was calculated to be 202.4 ft^2/day. Slug test data, as well as equations and calculations used to determine these values, are contained in appendix D.

5.4 Tidal Influence Monitoring

The maximum response of the water level in monitor wells JAX-159-GH-6 and JAX-159-GH-12 over a 24+ hour period , as a result of tidal fluctuation in the St. Johns River, adjacent to the site, was less than 0.2 foot. The proximity of the wells tested to the St. Johns River (approximately 1,000 feet) would indicate that the recorded response may represent the upper limit of tidal influence in the study area.

5.5 Potable Water Well Survey

Naval Air Station Jacksonville presently provides all of its own potable water. Raw water supply is obtained from three 12-inch, one 10-inch and one 8-inch diameter wells located on the station which draw water from the Floridan aquifer at depths from approximately 312 to 1,015 feet. Individual well capacities range between 150 and 3800 GPM.

Since all of the area within a ½-mile radius of Facility 159 is within the Naval Station boundary, a potable water well survey of the area surrounding Facility 159 was conducted using data supplied by the Naval Air Station Jacksonville, Public Works Department, as well as data supplied by the City of Jacksonville Department of Health, Welfare, and Bio-Environmental Services. All known potable wells on the Naval Air Station were researched for applicable information and included in table 8. The locations of these wells are shown on figure 9. The Naval Station water supply wells are more than ½-mile from Facility 159. These wells are completed in the Floridan

aquifer and have a minimum casing depth of 270+ feet. The fact that these wells are cased to these depths, are some distance away, and none are down-gradient from the site, should preclude any effects from the shallow contaminants at the Fuel farm.

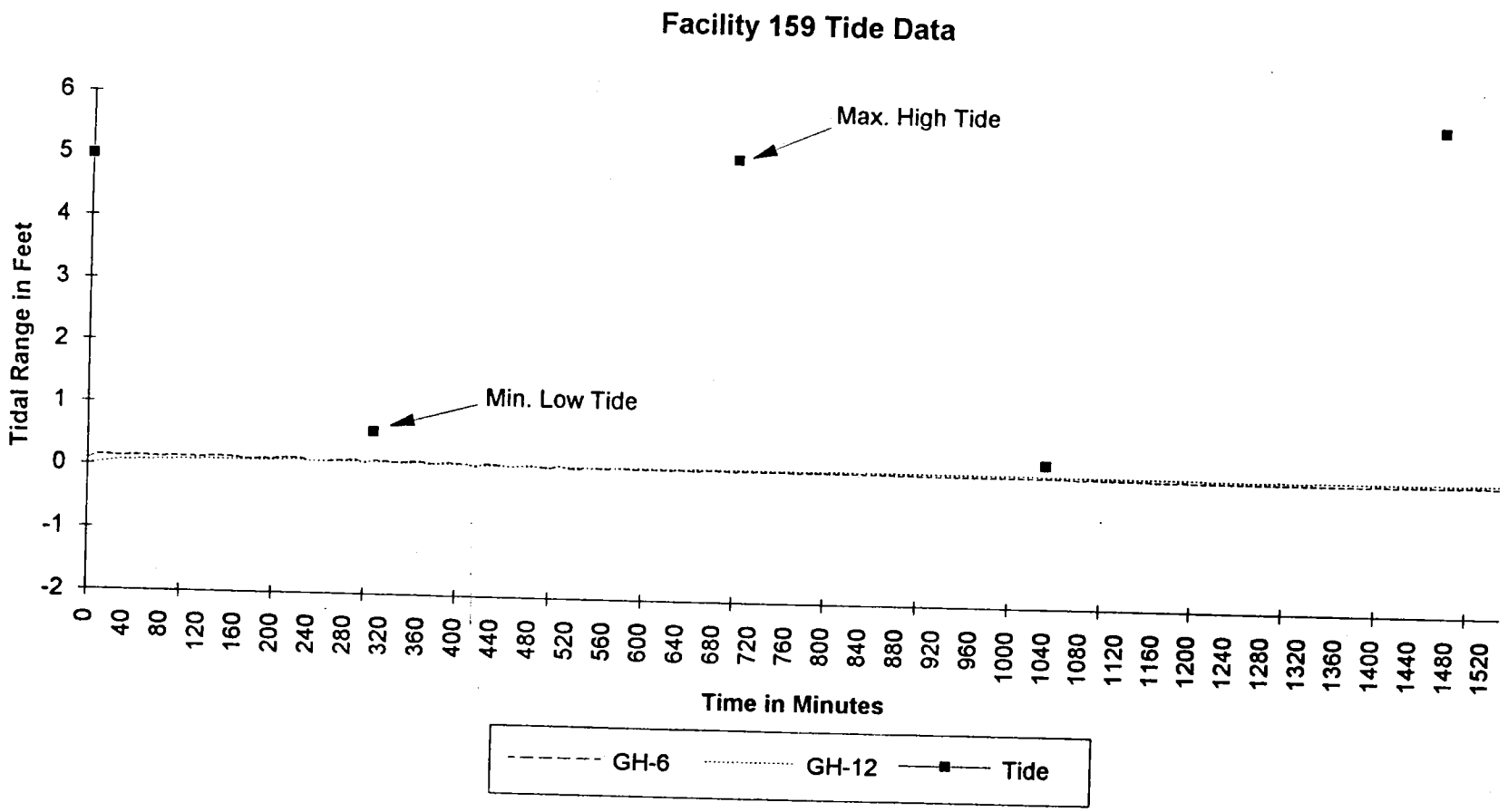

Facility 159 Tide Data
Max. High Tide
Min. Low Tide
Tidal Range in Feet
6
5
4
3
2
1
0
-1
-2
0
40
80
120
160
200
240
280
320
360
400
440
480
520
560
600
640
680
720
760
800
840
880
920
960
1000
1040
1080
1120
1160
1200
1240
1280
1320
1360
1400
1440
1480
1520
Time in Minutes
GH-6
GH-12
Tide

TABLE 7

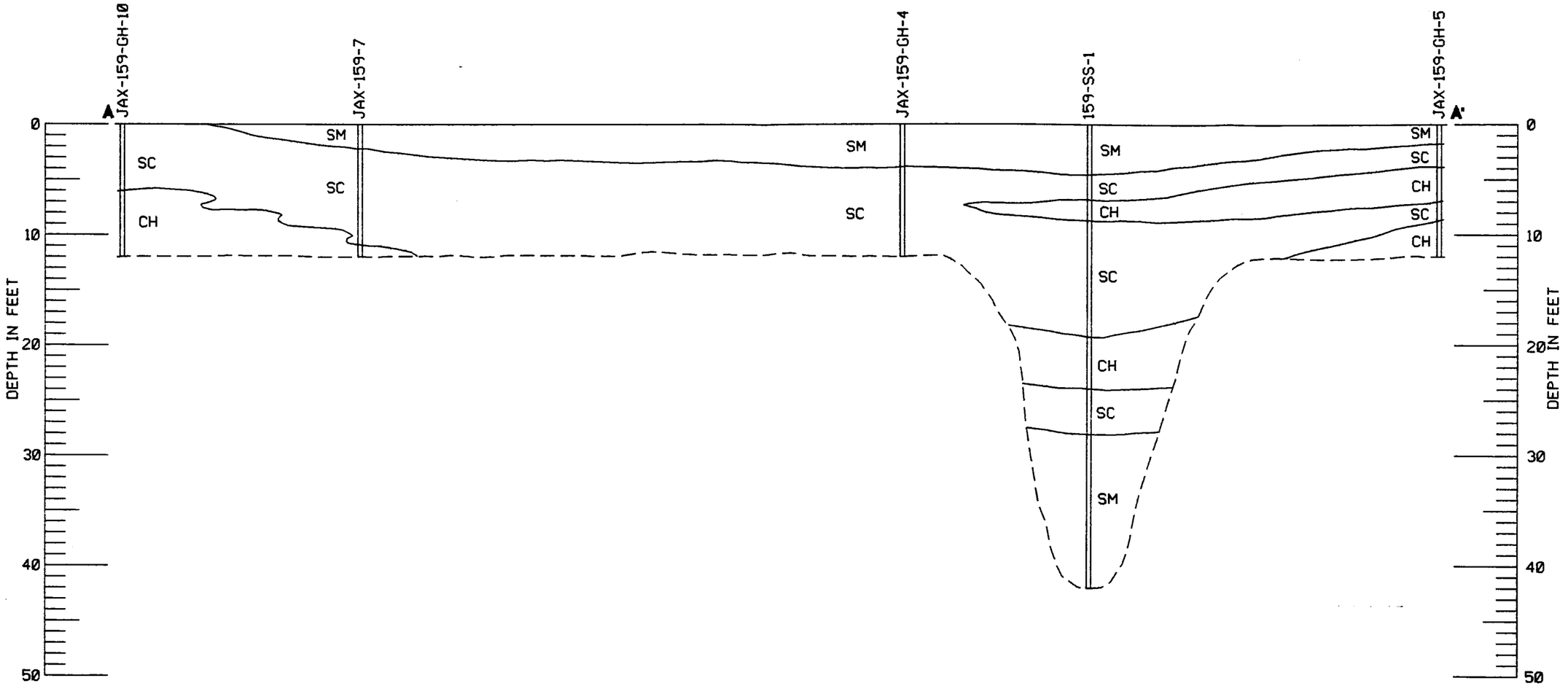
FIELD WATER QUALITY PARAMETERS

FACILITY 159 - GAS HILL FUEL FARM
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

10 JANUARY 1992

Well No.	pH	Specific Conductance (umhos/cm)	Temperature (Degrees Celsius)
JAX-159-GH-1	6.73	507	18.9
JAX-159-GH-2	6.76	408	17.7
JAX-159-GH-3	6.96	739	16.7
JAX-159-GH-4	6.85	799	17.5
JAX-159-GH-5	6.63	2290	20.2
JAX-159-GH-6	6.88	1304	20.9
JAX-159-GH-7	6.64	764	19.5
JAX-159-GH-8	6.62	652	18.2
JAX-159-GH-9	6.91	614	17.7
JAX-159-GH-10	6.95	727	17.1
JAX-159-GH-11	7.91	453	21.2
JAX-159-GH-12	6.94	398	21.4
JAX-159-GH-13	6.52	561	17.9

8/26/92
watqual.tbl



SCALE: 1"=10' VERT.
1"=60' HORIZ.

LEGEND

SC	CLAYEY SAND
SM	SILTY SAND
CH	FAT CLAY

U. S. ARMY ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PETROLEUM CONTAMINATION ASSESSMENT
BLDG. 159

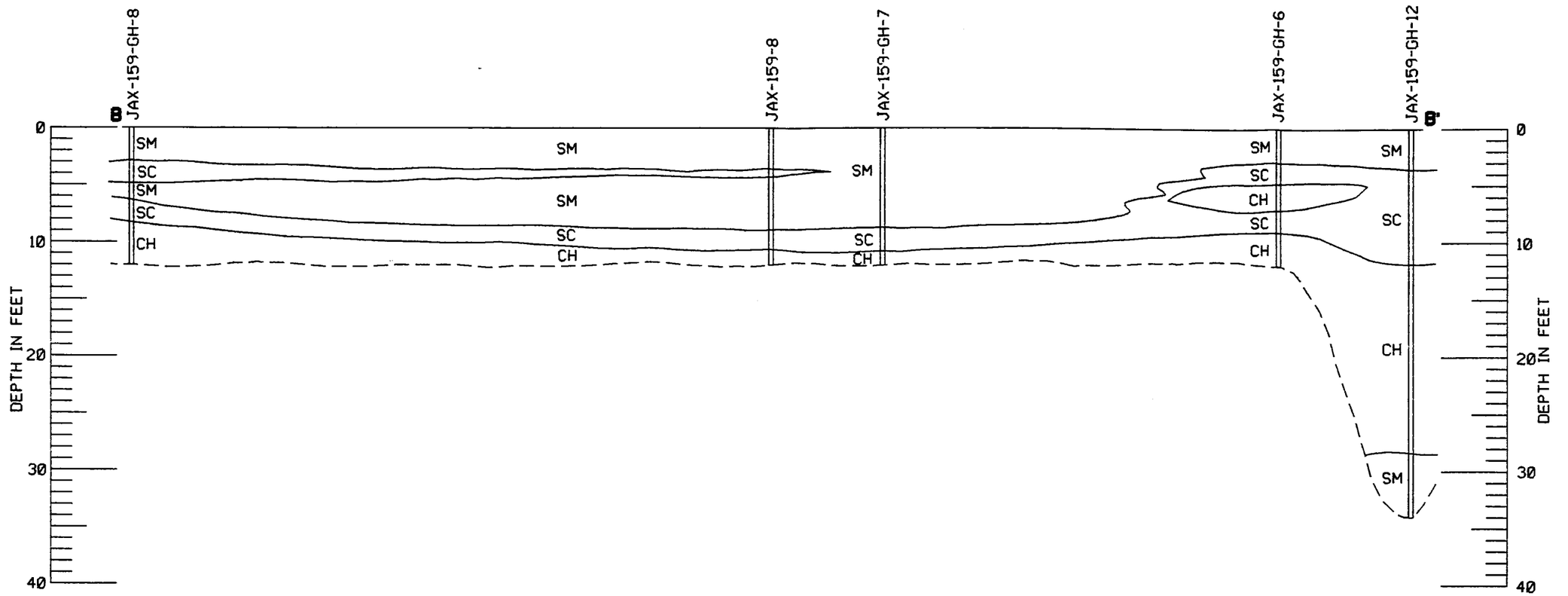
FIGURE 4A

GEOLOGIC CROSS SECTION

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: AS SHOWN

J:\ENG\SMITH\JAX159\CROSSEC.DGN



SCALE: 1"=10' VERT.
1"=60' HORIZ.

LEGEND

SC	CLAYEY SAND
SM	SILTY SAND
CH	FAT CLAY

U. S. ARMY ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PETROLEUM CONTAMINATION ASSESSMENT
BLDG. 159

FIGURE 48

GEOLOGIC CROSS SECTION

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: AS SHOWN

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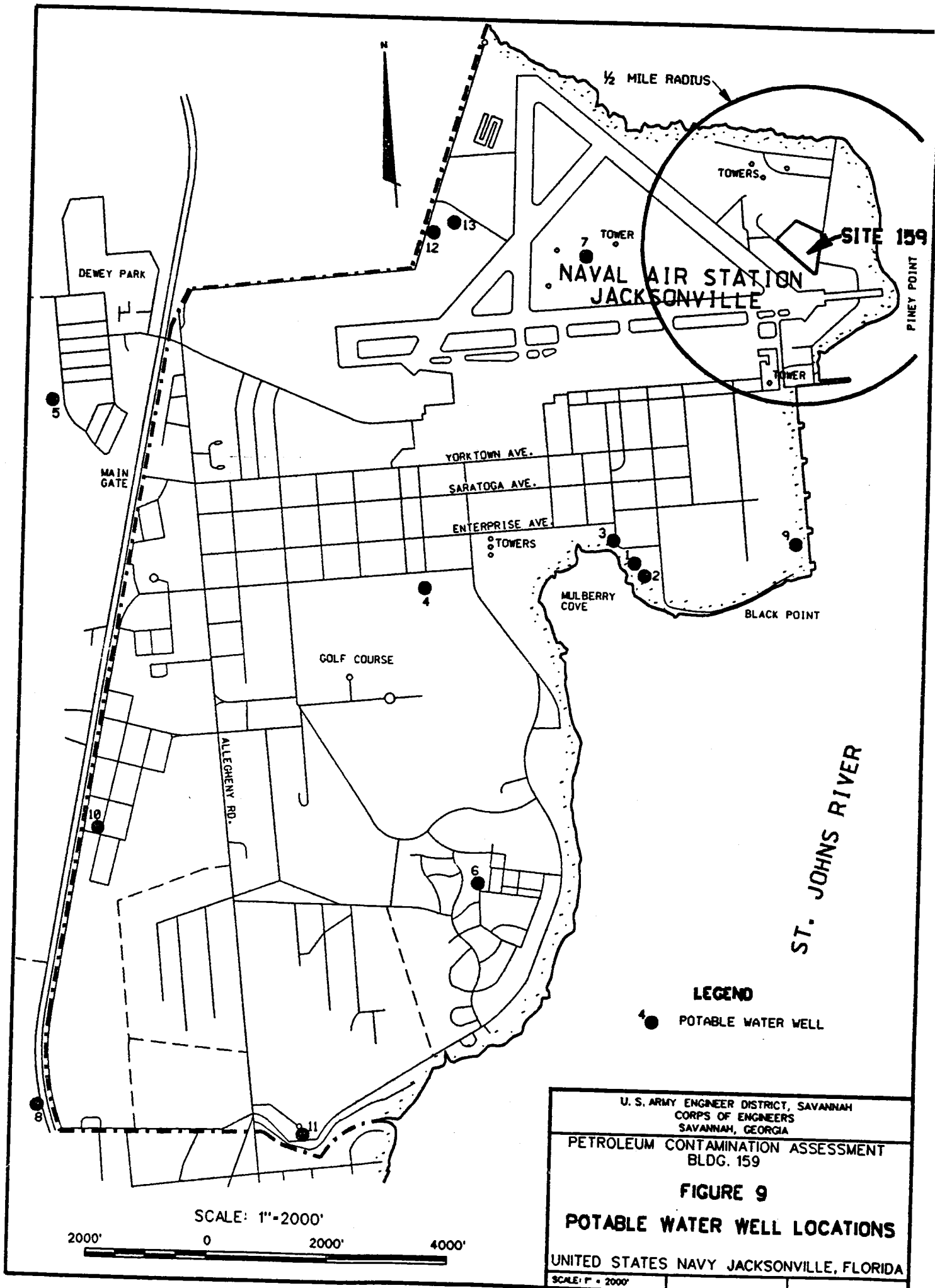
TABLE 8

WATER WELL SURVEY

FACILITY 159 - GAS HILL FUEL FARM
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Well No.	Usage	Casing Diameter	Total Depth (feet)	Casing Depth (feet)	Notes
1	Potable	12	1215	380	Water Plant no. 1
2	Potable	18	1200	400	Water Plant no. 1
3	Potable	18	1200	400	Water Plant no. 1
4	Potable	12	1015	312	Water Plant no. 2
5	Potable	12	988	400	Water Plant no. 3
6	Potable	12	646	271	Water Plant no. 4
7	Non-potable	4	?	?	Abandoned
8	Non-potable	8	400	288	DRMO
9	Non-potable	12	800	?	Black Point - Kemen Test Cell
10	Non-potable	10	1096	316	Fire Protection Warehouse Area
11	Non-potable	4	407	251	
12	Non-potable	6	120	120	
13	Non-potable	4	650	120	


N
½ MILE RADIUS
TOWERS
SITE 159
PINEY POINT
TOWER
7
NAVAL AIR STATION
JACKSONVILLE
TOWER
13
12
DEWEY PARK
5
MAIN
GATE
YORKTOWN AVE.
SARATOGA AVE.
ENTERPRISE AVE.
TOWERS
3
1
2
9
4
MULBERRY
COVE
BLACK POINT
GOLF COURSE
ALLEGHENY RD.
10
6
ST. JOHNS RIVER
8
11
LEGEND
4 POTABLE WATER WELL
SCALE: 1"-2000'
2000' 0 2000' 4000'
U. S. ARMY ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA
PETROLEUM CONTAMINATION ASSESSMENT
BLDG. 159
FIGURE 9
POTABLE WATER WELL LOCATIONS
UNITED STATES NAVY JACKSONVILLE, FLORIDA
SCALE: 1" = 2000'

6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 Summary

The following is a summary of site conditions based on the results of field and laboratory investigations made during contamination assessment:

1. Three water bearing zones apparently exist beneath the site. These consist of a surficial aquifer, a shallow rock aquifer, and the deeper Floridan aquifer.

2. Soil borings indicate the sediments beneath the site generally consist of unconsolidated, brown, fine grained sands and silty sands. A confining unit consisting of a very fine, silty, fat clay appears to be locally prevalent at approximately 18 to 25 feet bls.

3. Ground water at the site was encountered at a depth of approximately 2.0 feet bls. The direction of flow in the surficial aquifer appears to be generally to the east towards the St. Johns River.

4. Free floating petroleum product was found in one previously installed monitor well during contamination assessment at the site. The maximum thickness of product measured in the well was approximately 0.3 foot.

5. Contaminants identified at the site during contamination assessment included benzene, ethylbenzene, toluene, xylenes, various naphthalenes, acenaphthene, acenaphthylene, and lead.

6. The vertical extent of contamination, as defined by the deep wells, does not exceed 25 feet bls.

7. Five potable water supply wells located on the Naval Air Station are all more than ½ mile from the site. All of these wells are cased to a depth of 270+ feet or more, where they draw from the Floridan aquifer, and none of the wells is down-gradient from the site.

8. Laboratory analyses of ground-water samples from monitoring wells placed around the down-gradient perimeter of the site detected only one low level occurrence of benzene (JAX-159-GH-8).

6.2 Conclusions

1. OVA headspace analyses and soil gas probes around the perimeter of the site indicate that soil contamination outside of the facility boundaries is minimal and is located in the areas of previously documented spills, seepages, and the perimeter ditches.

2. The low concentration of benzene detected in JAX-159-GH-8 is probably due to the closed loading facility immediately up-gradient and not the result of leakage from tanks and their appurtenances.

3. Ground-water contamination beyond the site boundaries appears to be coincident with the areas of embankment seepage and historic spills. The high clay concentration in the subsurface appears to have restricted the movement of contaminants. The results of the ground-water hydraulic conductivity testing also indicate that subsurface contaminant movement would be restricted.

6.3 Recommendations

Because soil at the site has been determined to be "excessively contaminated" for kerosene group contaminants, and ground-water contamination beneath the site exceeds Chapter 17-770, FAC, levels for Class G-II ground water, it is recommended that a Remedial Action Plan (RAP) be prepared to address the contamination.

REFERENCES

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APPENDIX A

SITE CONDITIONS

Physiography

The topography of northeast Florida is controlled by a series of ancient marine terraces, generally indicated by low seaward sloping scarps trending more or less parallel to the present shoreline (Cooke, 1945). Seven of these terraces are recognized in northeast Florida; in descending order they are the Coharie, Sunderland, Wicomico, Penholoway, Talbot, Pamlico, and Silver Bluff terraces. The terraces have been modified by stream erosion to the point that only remnants of the original terraces remain. The areal distribution of the terraces has generally been determined by their elevation above mean sea level (Leve, 1966). The Naval Air Station Jacksonville lies within the Pamlico terrace (10-25 feet above msl).

Surface drainage of the eastern area of Duval County is primarily by numerous small brackish-water streams which empty either into the Intracoastal Waterway or directly into the ocean.

Naval Air Station Jacksonville lies on the west bank of the St. Johns River. The site lies within the Coastal Lowland physiographic division of northeastern Florida, which runs roughly parallel to the coastline and extends from the Atlantic Ocean to just west of downtown Jacksonville. Site elevations range from approximately 6 to 9 feet above msl. Site surface drainage is controlled by the St. Johns River to the east and south.

Regional Hydrogeology

The southeast Georgia and northeast Florida area is underlain by two main aquifer systems: the Surficial aquifer system and the Floridan aquifer system. A third aquifer system, the Southeastern Coastal Plain aquifer system, underlies the Floridan aquifer system in southeast Georgia, portions of northeast Florida, and the Florida panhandle (Miller, 1990).

The Surficial aquifer system is comprised of Holocene through Miocene deposits and contains water mostly under unconfined (water table) conditions. These deposits consist of a thin, widespread layer of unconsolidated sand beds that commonly contain a few beds of shell and limestone. This aquifer system generally yields small volumes of water, and primarily is used for domestic water supplies.

The Floridan aquifer system consists of a thick sequence of Tertiary carbonate rocks and is the most productive aquifer in the southeastern U.S. The Floridan supplied more than 3 billion gallons of water per day during 1985, primarily for municipal and agricultural purposes (Miller, 1990). The Floridan underlies the Surficial aquifer system and is separated from it by a clayey confining unit which is thick in some places and thin (or absent) in others. The formations that comprise the Floridan, from oldest to youngest, are the Oldsmar Limestone, the Lake

City Limestone, the Avon Park Limestone, the Ocala Limestone, and several thin discontinuous aquifers in the Hawthorne Formation which are hydraulically connected to the rest of the system (Leve, 1966).

The Floridan aquifer system can generally be divided into an Upper Floridan aquifer and a Lower Floridan aquifer, separated by a less permeable unit in most places and bounded above and below by confining units that are much less permeable. The Lower Floridan aquifer locally contains zones that are extremely permeable.

The Southeastern Coastal Plain aquifer system underlies the Floridan aquifer system in some places and grades laterally into the Floridan in other places. There is no confining unit separating the two aquifer systems, and the major difference between them is that the Floridan aquifer system tends to be more permeable.

Two of the above mentioned aquifer systems, the shallow Surficial aquifer and the Floridan aquifer, are known to underlie Duval County (Leve, 1966).

APPENDIX B

SITE ASSESSMENT METHODS

Soil Sampling

A series of shallow soil borings were drilled at the site to determine the horizontal and vertical extent of petroleum contamination in the soil. These borings were drilled using a 3-inch stainless steel hand auger with samples taken at approximate depth intervals of 2 feet, until the water table was encountered. During drilling, soils from each boring were visually inspected for petroleum contamination, and petroleum odors were noted where encountered. The soil samples were analyzed using an Organic Vapor Analyzer (OVA) to perform the headspace technique described in Chapter 17-770.200, FAC and FDER "Guidelines for Assessment and Remediation of Petroleum Contaminated Soils." Carbon filters were used on the OVA to aid in the distinction of naturally occurring methane from hydrocarbon vapors. A photo-ionizing meter was also used with the OVA at times to further identify suspected methane influences, since the photo-ionizing detector (PID) will not detect methane because the ionization potential of methane is higher than the ionization potential of the detector.

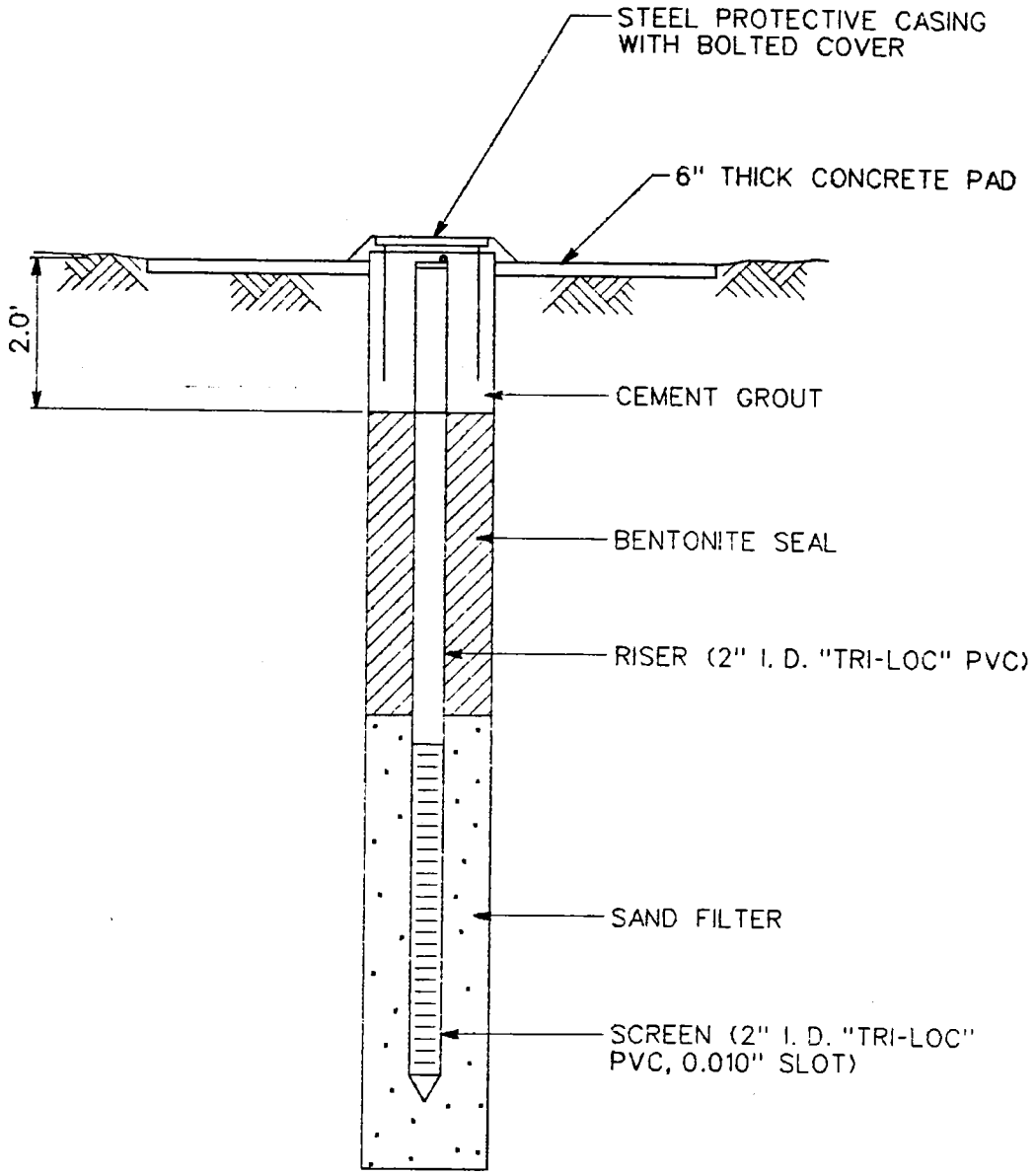
Additionally, numerous soil gas probes were executed during this investigation using the following procedures: A 2-inch diameter, perforated, hollow metal probe was hydraulically driven into the soil to a depth of .5 foot. At this point, a vacuum pump was used to evacuate the probe and draw a soil gas sample into the probe. This sample was pumped to a monitoring port where the vapor was sampled by an OVA and/or a PID. After recording the readings and flushing the sample from the system, the probe was advanced another .5 foot and a new soil gas sample was extracted. This process was continued until the water table was encountered and at this point the sampling was terminated.

Monitoring Well Installation

Based on the findings of the soil borings and headspace analyses, permanent monitoring wells were installed within and adjacent to areas of elevated OVA readings to detect and characterize ground-water contamination at the site. All permanent shallow wells were installed using a drill rig with hollow stem auger and were constructed of 2-inch i.d. flush threaded, schedule 40 PVC pipe, with a 0.010-inch slotted screen (see figure 10). Shallow wells were constructed with a 10-foot section of screen placed such that a minimum of 1 foot of screen was above the existing water table to allow for water table fluctuations. Two deep monitoring wells were constructed using a double-casing method by first installing 8-inch, schedule 40 PVC pipe to a depth of 20 feet and then using mud rotary drilling. The annulus around the 8-inch PVC pipe was then grouted with cement-bentonite grout. After the grout had set, the remaining portion of the boring was advanced by wash boring 6-inch aluminum casing to a total depth of 30-35 feet. Two-inch PVC pipe with 5 feet of 0.010-inch slotted screen was then installed. The risers in all wells extend from the top of the screens to the ground surface. A filter of 20/30 silica sand was placed in the annular space around screens up to 0.5 to 1 foot above the top of the screens. A 1 to 2-foot bentonite seal was placed above the filter sand. The remaining annular space above the bentonite seal was then grouted with a cement-bentonite grout to the surface. An 8-inch diameter, steel protective vault with bolt-down cover was flush-

mounted at the ground surface, within a 3-foot square, wire reinforced concrete pad. A 2-inch locking cap was installed at the top of the well riser.

Upon completion of the monitoring well installations, the wells were developed using a centrifugal pump or bailer (properly decontaminated between wells) until the ground water was relatively sediment-free, or as clear as conditions allowed in a reasonable period of time.



NOT TO SCALE

U. S. ARMY ENGINEER DISTRICT, SAVANNAH
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

PETROLEUM CONTAMINATION ASSESSMENT
BLDG. 159

FIGURE 10

TYPICAL MONITOR WELL

UNITED STATES NAVY JACKSONVILLE, FLORIDA

SCALE: N/A

Ground-Water Elevation Survey

The depth to water in each monitor well was measured from a reference point established on the top of the well casing. Measurements were taken to the nearest 0.01 foot with an electric water level meter. After water level measurements were taken, a bailer was used to check for any free product in wells. Ground-water elevations were plotted on a scaled map, and water elevation contours were constructed. Flow directions were estimated based on flow lines drawn perpendicular to the elevation contours. The hydraulic gradient of the ground water was determined by calculating the differences in elevation between two data points on the map and dividing the elevation difference by the distance between the two points.

Ground-Water Sampling

Each monitor well was purged of a minimum of three volumes using a Teflon bailer. Well purging continued until field parameters (pH, specific conductance, and temperature) stabilized. Specific conductance and pH were measured using a Davis, DspH-3 meter. Temperature was measured with a Davis digital thermometer. Ground-water samples were collected using a Teflon bailer and placed in appropriate containers. The samples were properly preserved, stored on ice, and delivered to the laboratory for analysis.

All monitor well samples were analyzed for the Florida Kerosene Group (FDER 17-770). Chain of custody was maintained on the samples throughout the sampling period (see appendix E). Sampling procedures were conducted according to U.S. Army Corps of Engineers, Savannah District's FDER-approved Comprehensive Quality Assurance Plan No. 910026G. Laboratory analyses were performed according to the laboratories' FDER-approved Generic Quality Assurance Plan.

Ground-Water Hydraulic Conductivity Testing

Slug tests were conducted on monitoring wells to allow estimation of the hydraulic conductivity of the surficial aquifer surrounding the wells. A 5-foot section of 1-inch diameter PVC pipe filled with sand and capped on the ends was used as a slug. A pressure transducer from an In-Situ, Inc., Hermit data logger was placed just above the bottom of the well to record water level changes with time. The slug was placed in the well and the water level allowed to recover to its normal static head. The slug was then quickly removed and the well allowed to recover to static conditions as the data logger recorded water level changes. Aquifer hydraulic conductivity characteristics were calculated from the well recovery data using AQTESOLV™, a computer program which applies methods developed by Hvorslev (1951) for characterizing hydraulic conductivity from slug test data. The slug test recovery curves generated by AQTESOLV™ are shown in appendix D.

APPENDIX C

WELL INSTALLATION REPORTS AND BORING LOGS

SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-1	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 16 SEP 91	**COMPLTD:** 16 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 1.5'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SM) Gray and brown, fine grained, silty SAND, no odor.		SM		
					Brown, wet, with some shell fragments.				
5					(SC) Gray and brown, very fine grained, clayey SAND.		SC		
					Green and brown, silty and clayey.				
					Slight organic odor.				
10					Light gray, very fine grained, silty.				
					BOTTOM OF HOLE 12.0'				
15					NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.				
20									

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-2	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 16 SEP 91	**COMPLTD:** 16 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 2.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SM) Brown, fine grained, silty SAND, organic odor.		SM		
					(SC) Tan, very fine grained, clayey SAND, organic odor.		SC		
5					Gray and brown.				
					(CH) Gray and tan, fat CLAY, very fine sandy, no odor.		CH		
10					Gray, very fine sandy, no odor.				
					(SC) Gray, very fine grained, clayey SAND, very slight organic odor.		SC		
					BOTTOM OF HOLE 12.0'				
15									
20									

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-3	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 17 SEP 91	**COMPLTD:** 17 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 2.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SM) Gray to tan, fine grained, silty SAND.		SM		
					Strong fuel odor.				
					(SC) Gray, very fine grained, silty clayey SAND, strong fuel odor.		SC		
5					Green with tan streaks, strong fuel odor.				
					Green and gray.				
					(CH) Green, fat CLAY, slight fuel odor.		CH		
10					Gray.				
					BOTTOM OF HOLE 12.0'				
15					NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.				
20									

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-4	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 17 SEP 91	**COMPLTD:** 17 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 2.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SM) Gray, fine grained, silty SAND, organic odor.		SM		
					Brown and gray.				
					Gray and dark brown.				
					(SC) Brown, very fine grained, clayey SAND.		SC		
5					Brown, slight organic odor.				
					Gray with tan streaks, odoriferous, organic and very slight fuel odor.				
					Odor of H_2S.				
10					Greenish gray, no odor.				
					BOTTOM OF HOLE 12.0'				
15					NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.				
20									

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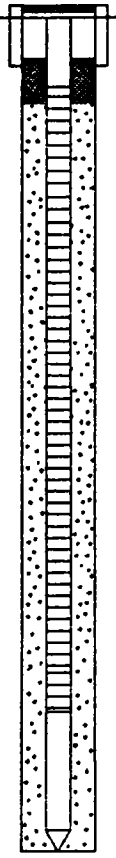
SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-5	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 17 SEP 91	**COMPLTD:** 17 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 2.5'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN
					(SM) Brown, fine grained, silty SAND, sweet organic odor.		SM	
					(SC) Gray with tan streaks, very fine grained, clayey SAND, sweet organic odor.		SC	
5					(CH) Gray with tan streaks, fat CLAY, no odor.		CH	
					(SC) Gray, very fine grained, silty clayey SAND, slight organic odor.		SC	
					Gray, no odor.			
10					(CH) Green, fat CLAY, slight organic odor.		CH	
					BOTTOM OF HOLE 12.0'			
15								
20								

WELL DATA



NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-6	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 18 SEP 91	**COMPLTD:** 18 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 2.0'-11.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 3.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SM) Brown, fine grained, silty SAND, no odor.		SM		
					Very slight organic odor.				
					(SC) Gray, fine grained, clayey SAND, slight organic odor.		SC		
5					(CH) Gray, fat CLAY, very fine sandy, no odor.		CH		
					(SC) Gray, very fine grained, clayey SAND, no odor.		SC		
10					(CH) Gray, fat CLAY, no odor.		CH		
					BOTTOM OF HOLE 12.0'				
15									
20									

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-7	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 18 SEP 91	**COMPLTD:** 18 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 2.5'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SM) Brown, fine grained, silty SAND, no odor.		SM		
					Brown and gray, wet.				
5					Light gray.				
					(SC) Green and gray, very fine grained, clayey SAND, slight organic odor.		SC		
10					(CH) Gray with brown streaks, fat CLAY, no odor.		CH		
					BOTTOM OF HOLE 12.0'				
15									
20									

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-8	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 19 SEP 91	**COMPLTD:** 19 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 3.5'-12.5'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 13.5'	**DEPTH TO ∇** 3.5'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SM) Brown, fine grained, silty SAND, no odor.		SM		
					Dark brown, slight organic odor.				
					(SC) Brown, very fine grained, clayey SAND, slightly wet.		SC		
5					(SM) Brown, fine grained, silty SAND, organic odor.		SM		
					(SC) Gray, fine grained, clayey SAND, slight organic odor.		SC		
					(CH) Reddish orange and green, fat CLAY, very fine sandy, no odor.		CH		
10					Sandy.				
					BOTTOM OF HOLE 13.5'				
15									
20									

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-9	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 19 SEP 91	**COMPLTD:** 19 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 2.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SC) Gray to brown, fine grained, clayey SAND, no odor.		SC		
					Light green, tan, gray.				
					Gray.				
5									
					(CH) Gray, fat CLAY, very fine sandy, no odor.		CH		
10					Gray and green, with some shell fragments.				
					BOTTOM OF HOLE 12.0'				
15									
20									

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-10	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 20 SEP 91	**COMPLTD:** 20 SEP 91
METHOD: 7¼" O.D. HSA	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 1.0'-10.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 12.0'	**DEPTH TO ▽** 2.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					(SC) Tan and gray, fine grained, clayey SAND, no odor.		SC		
					Gray.				
5					Green.				
					(CH) Gray with green and tan streaks, fat CLAY, no odor.		CH		
					Gray and green.				
10									
					BOTTOM OF HOLE 12.0'				
15									
					NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.				
20									

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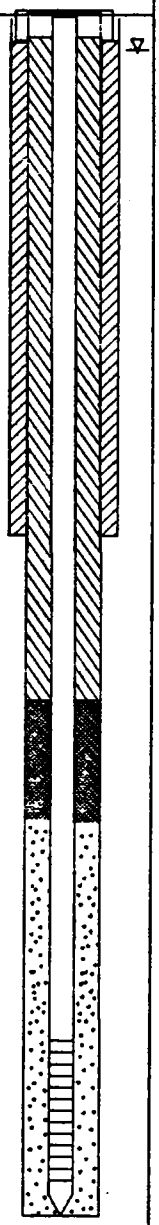
SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-11	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 3 OCT 91	**COMPLTD:** 8 OCT 91
METHOD:	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 29.5' to 33.5'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 34.5'	**DEPTH TO ▽** 1.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN
0					(SM) Brown, fine grained, silty SAND.		SM	
					Brown and gray.			
5								
					(SC) Gray, very fine grained, stiff, clayey SAND.		SC	
10					Greenish gray.			
					(SC-SP) Gray to light brown, very fine grained, silty clayey SAND to very fine grained, poorly graded SAND.		SC SP	
15					(CH) Green and gray, fat CLAY with some shell fragments.		CH	
					With no shell fragments.			
20					Gray and stiff.			
					(SC) Gray, very fine grained, silty clayey SAND.		SC	
25								
					(SM) Light greenish gray, fine grained, silty SAND.		SM	
30								
35					BOTTOM OF HOLE 34.5'			
40								

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

WELL DATA



NOTE:
INSTALLED 8" SCH. 40 PVC PIPE TO 21.0'. DRILLED THROUGH 8" PVC WITH ROCK BIT TO 34.0'. INSTALLED 6" ALUMINUM CASING TO 34.0'. INSTALLED 2" MONITOR WELL TO SPECIFICATIONS.

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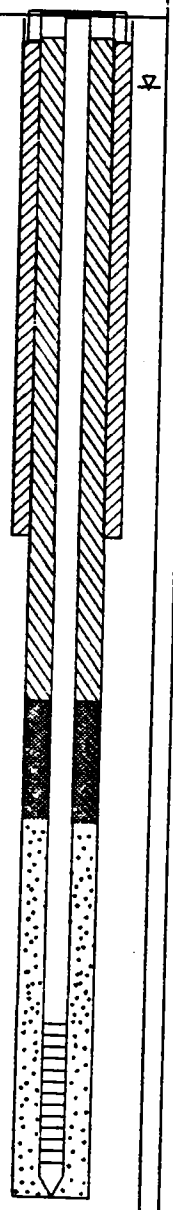
SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
GROUNDWATER MONITORING WELL INSTALLATION REPORT

TITLE: Jacksonville Naval Air Station Building 159		**LOG of WELL:** JAX-159-GH-12	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:**
CONTRACTOR: USACE - Sav. District		**DATE STARTED:** 3 OCT 91	**COMPLTD:** 7 OCT 91
METHOD:	**CASE SIZE:** 2" PVC	**SCREEN INT.:** 29.0' to 33.0'	**PROTECTION LEVEL:** D
TOC ELEV.:	**MONITOR INST.:** OVA	**TOT. DEPTH:** 34.0'	**DEPTH TO ▽** 2.0'
LOGGED BY: C. GRIFFIN	**WELL DEVELOPMENT DATE:**		**SITE:** Bld. 159

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN
					(SM) Brown, fine grained, silty SAND.		SM	
5					(SC) Gray and brown, very fine grained, clayey SAND.		SC	
10					Greenish gray, fine grained.			
15					(CH) Gray with brown streaks, stiff, fat CLAY.		CH	
20					Gray.			
25					Very fine sandy.			
30					(SM) Gray with orange streaks, fine grained, silty SAND.		SM	
35					BOTTOM OF HOLE 34.0'			
40								

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.



NOTE:
INSTALLED 8" SCH. 40 PVC PIPE TO A DEPTH OF 21.0'. GROUTED WITH CEMENT AND BENTONITE MIXTURE TO SURFACE. ROCKBIT THROUGH 8" SCH. 40 PVC TO 21.0'. INSTALLED 6" ALUMINUM CASING TO 34.0'. CLEANED OUT BORING WITH CLEAR WATER. INSTALLED MONITOR WELL TO SPECIFICATIONS.

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Hole No. JAX-159-SS-1

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION JACKSONVILLE NAVAL AIR STATION, FL.	SHEET 1 OF 2 SHEETS
1. PROJECT SITE 159-BULK FUEL STORAGE FACILITY		10. SIZE AND TYPE OF BIT 4" SPIRAL AUGER-6" FISHTAIL BIT, 1 3/8" ID SPLITSPOON	
2. LOCATION (Coordinates or Station) SEE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY SAVANNAH DISTRICT		12. MANUFACTURER'S DESIGNATION OF DRILL CME 55	
4. HOLE NO. (As shown on drawing title and file number) JAX-159-SS-1		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 9 / UNDISTURBED 0
5. NAME OF DRILLER CLARENCE SALMON		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE	STARTED 23 SEP 1991 / COMPLETED 23 SEP 1991
7. THICKNESS OF OVERBURDEN 42.0'		17. ELEVATION TOP OF HOLE 5.50	
8. DEPTH DRILLED INTO ROCK 0.0'		18. TOTAL CORE RECOVERY FOR BORING	X
9. TOTAL DEPTH OF HOLE 42.0'		19. SIGNATURE OF INSPECTOR CHARLES D. GRIFFIN	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	OVA COLLAR (ppm) e	JAR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
5.5	0		(SM) Gray, fine grained, silty SAND.		1	BLOWS 12
			Gray and light brown.			W. L. 1.5', DEPTH TO WATER DURING DRILLING.
1.0	5		(SC) Gray with tan streaks, very fine grained, clayey SAND.		2	23
-1.5			(CH) Greenish gray with tan streaks, fat CLAY.			W. L. 0.8', WATER LEVEL READING 24 HRS. AFTER HOLE COMPLETED.
-3.5	10		(SC) Light greenish gray, very fine grained, clayey SAND, with some fat clay seams.		3	18
	15		Gray.		4	NOTE: DOWNHOLE TOOLS DECONED BEFORE USE. 16
-14.0	20		(CH) Gray with tan streaks, fat CLAY with some sand.		5	14
-18.5	25		(SC) Gray, very fine grained, silty clayey SAND.		6	27
-22.0			(SM) Gray with traces of tan streaks, very fine grained, silty SAND.			
-24.5	30					

NOTE:
SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

BLOWS PER FOOT:
NUMBER REQUIRED TO DRIVE 1 3/8" ID SPLITSPOON W/140 LB. HAMMER FALLING 30".

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE 5.50

Hole No. JAX-159-SS-1

PROJECT
SITE 159-BULK FUEL STORAGE FACILITY

INSTALLATION
JACKSONVILLE NAVAL AIR STATION, FL.

SHEET 2 OF 2 SHEETS

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	JAR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g) BLOWS
-24.5	30		(SM) Gray with traces of tan streaks, very fine grained, silty SAND.		7	54
	35		Gray.		8	10
	40		Very fine grained, soft.		9	4
-36.5			BOTTOM OF BORING 42.0'			9

45
50
55
60
65
70
75
80

APPENDIX D

AQUIFER TEST CALCULATIONS AND DATA

Ground-water Hydraulic Conductivity Testing Results

An estimate of the average linear pore water velocity was derived employing the following variation of Darcy's Law:

$$V = (K * I)/n$$

where

V = discharge (velocity),

K = hydraulic conductivity in feet/day,

I = hydraulic gradient, and

n = estimated porosity

Assuming an average porosity of 30 percent, a average hydraulic gradient across the site of 1.6×10^{-3}, and an approximate average shallow subsurface horizontal hydraulic conductivity of 17.3 ft/day, the calculated pore water velocity would be:

$$V = (17.3 * 1.6\times10^{-3})/.30$$

$$V= 0.1 \text{ foot/day}$$

Transmissivity was calculated using the following formula:

$$T = K \times b$$

where

T = transmissivity in ft^2/day,

K = hydraulic conductivity in ft/day, and

b = aquifer test interval (thickness)

Therefore

$$T = 17.3 \times 11.7$$

$$T = 202.4 \text{ } ft^2/day$$

Employing the same methods to the deep well produces a calculated pore water velocity of 0.014 ft/day and a transmissivity of 80.3 ft^2/day.

FACILITY 159 TIDE DATA

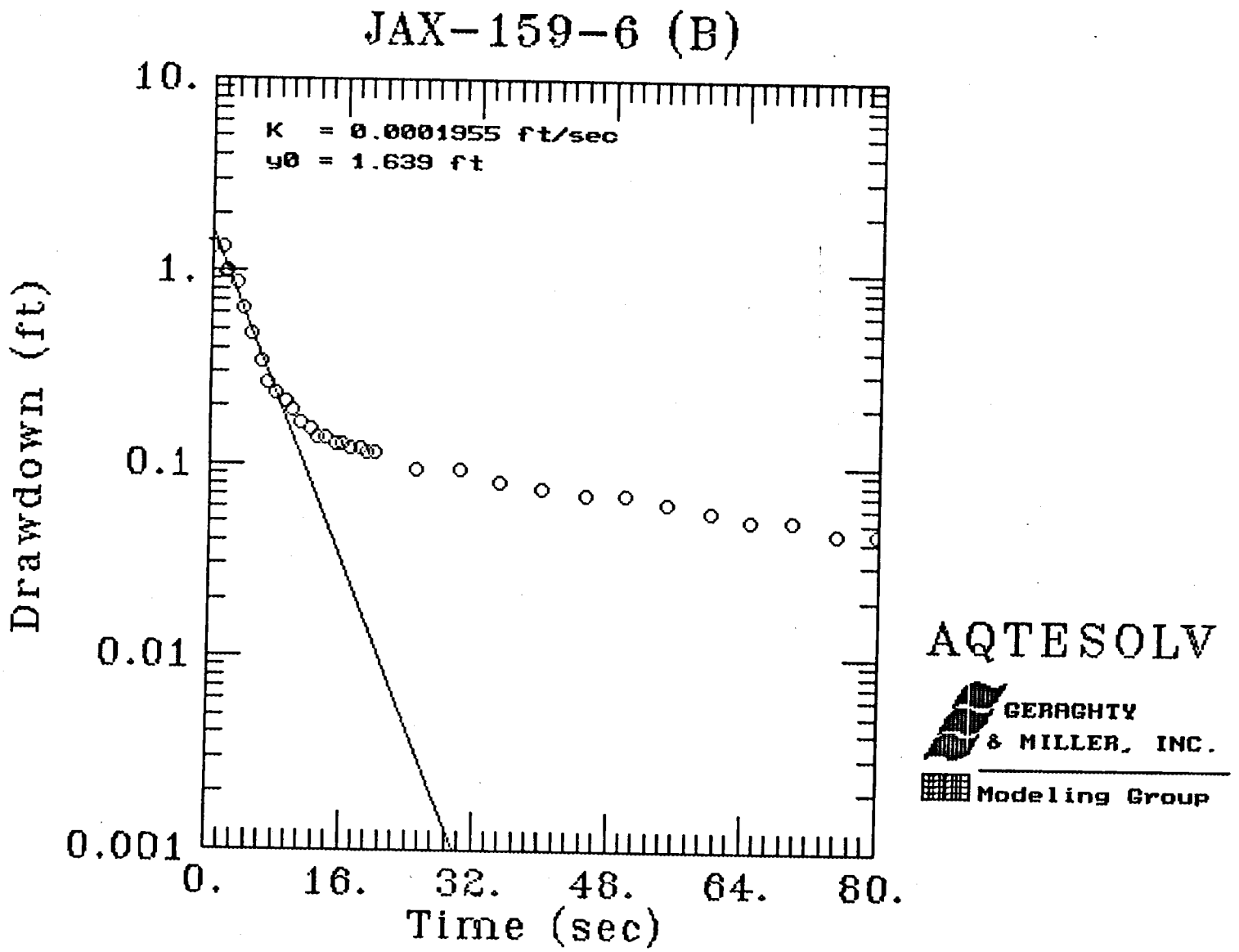
		SE1000C	
	Environmental Logger		
	10/25/92		17:17
	Unit# 01561 Test 4		
Setups:	Input 1	Input 2	
Type	level (F)	level (F)	
Mode	surface	surface	
I.D.	0	0	
Reference	0	0	
Linearity	0.13	0.03	
Scale factor	20	10.05	
Offset	-0.02	0	
Delay mSEC	50	50	
Step 0 10/22 07:59:22			
			calculated
Time	Input 1	Input 2	tide*
0	0.082	0.003	4.98
10	0.146	0.031	
20	0.146	0.047	
30	0.14	0.06	
40	0.14	0.069	
50	0.146	0.076	
60	0.146	0.082	
70	0.14	0.085	
80	0.14	0.088	
90	0.146	0.095	
100	0.146	0.098	
110	0.146	0.098	
120	0.14	0.101	
130	0.152	0.108	
140	0.152	0.111	
150	0.152	0.111	
160	0.146	0.111	
170	0.127	0.108	
180	0.127	0.108	
190	0.14	0.114	
200	0.127	0.114	
210	0.152	0.123	
220	0.152	0.127	
230	0.152	0.127	
240	0.108	0.111	

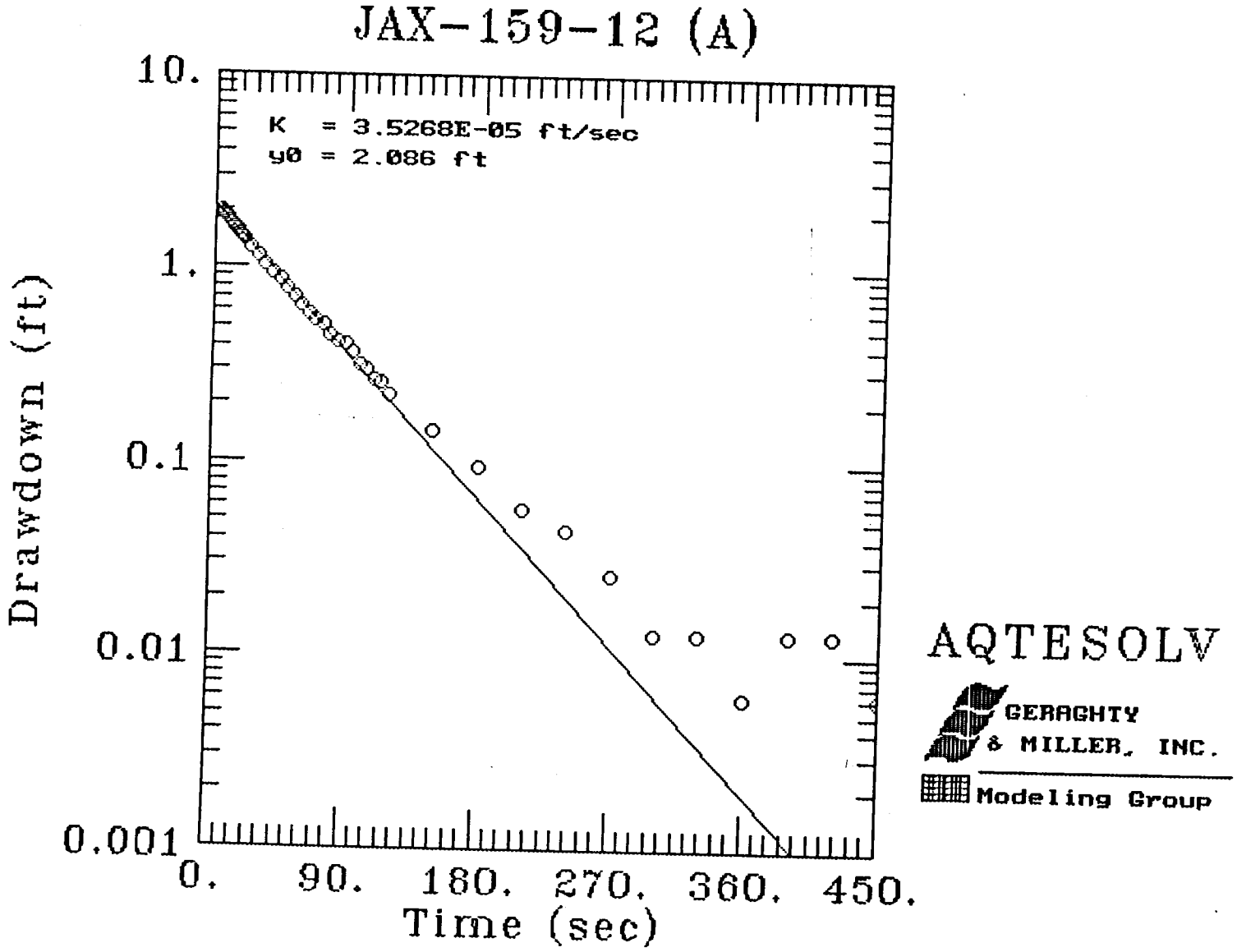
250	0.114	0.111	
260	0.114	0.111	
270	0.133	0.117	
280	0.127	0.117	
290	0.146	0.123	
300	0.095	0.108	
310	0.14	0.12	0.6
320	0.127	0.12	
330	0.12	0.114	
340	0.12	0.111	
350	0.133	0.114	
360	0.14	0.12	
370	0.108	0.104	
380	0.102	0.108	
390	0.127	0.111	
400	0.12	0.111	
410	0.114	0.108	
420	0.076	0.092	
430	0.12	0.104	
440	0.12	0.101	
450	0.102	0.101	
460	0.089	0.095	
470	0.102	0.101	
480	0.108	0.104	
490	0.095	0.098	
500	0.076	0.095	
510	0.12	0.108	
520	0.082	0.098	
530	0.076	0.098	
540	0.102	0.104	
550	0.095	0.101	
560	0.095	0.101	
570	0.102	0.104	
580	0.102	0.108	
590	0.089	0.104	
600	0.095	0.108	
610	0.095	0.108	
620	0.095	0.111	
630	0.095	0.111	
640	0.102	0.114	
650	0.095	0.114	
660	0.095	0.117	
670	0.102	0.117	
680	0.102	0.117	
690	0.102	0.12	
700	0.095	0.12	5.1
710	0.102	0.12	

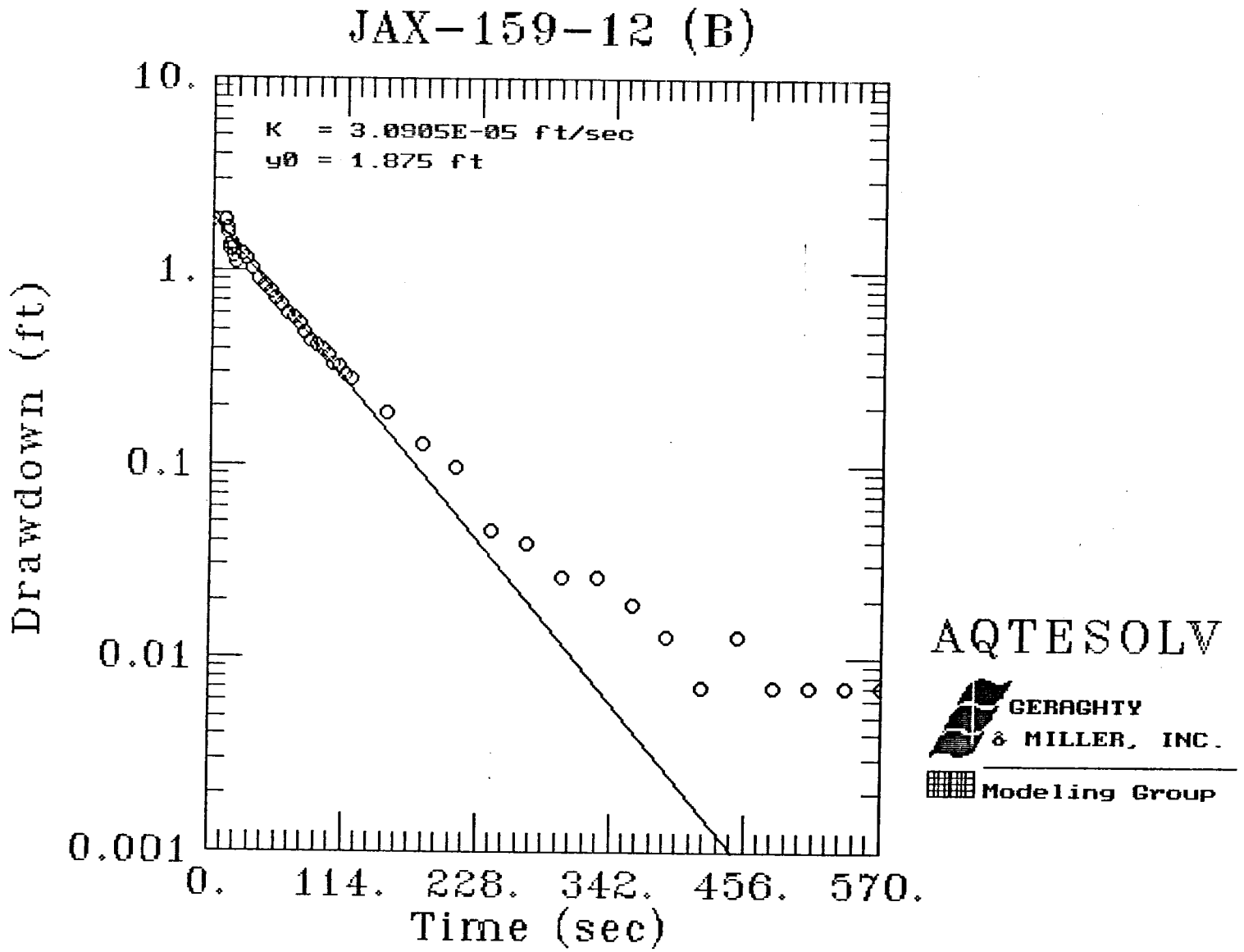
FACILITY 159 TIDE DATA

720	0.102	0.12	
730	0.102	0.123	
740	0.102	0.123	
750	0.102	0.123	
760	0.102	0.123	
770	0.095	0.123	
780	0.102	0.123	
790	0.102	0.123	
800	0.102	0.123	
810	0.102	0.127	
820	0.102	0.127	
830	0.102	0.127	
840	0.102	0.123	
850	0.102	0.127	
860	0.102	0.127	
870	0.102	0.127	
880	0.095	0.127	
890	0.102	0.127	
900	0.095	0.127	
910	0.095	0.127	
920	0.095	0.127	
930	0.095	0.127	
940	0.095	0.127	
950	0.095	0.127	
960	0.095	0.127	
970	0.095	0.127	
980	0.095	0.127	
990	0.089	0.13	
1000	0.095	0.13	
1010	0.089	0.127	
1020	0.089	0.127	
1030	0.089	0.127	
1040	0.089	0.123	0.3
1050	0.089	0.123	
1060	0.089	0.123	
1070	0.082	0.123	
1080	0.082	0.123	
1090	0.089	0.123	
1100	0.082	0.123	
1110	0.082	0.123	
1120	0.082	0.123	
1130	0.082	0.12	
1140	0.082	0.12	
1150	0.082	0.12	
1160	0.076	0.117	
1170	0.076	0.117	
1180	0.076	0.117	

1190	0.082	0.117	
1200	0.076	0.117	
1210	0.076	0.117	
1220	0.076	0.114	
1230	0.076	0.114	
1240	0.076	0.114	
1250	0.076	0.114	
1260	0.076	0.114	
1270	0.076	0.114	
1280	0.076	0.114	
1290	0.076	0.114	
1300	0.076	0.117	
1310	0.076	0.114	
1320	0.076	0.114	
1330	0.076	0.114	
1340	0.076	0.117	
1350	0.076	0.117	
1360	0.076	0.117	
1370	0.076	0.117	
1380	0.076	0.117	
1390	0.076	0.117	
1400	0.082	0.12	
1410	0.082	0.12	
1420	0.076	0.12	
1430	0.082	0.12	
1440	0.082	0.123	
1450	0.082	0.123	
1460	0.082	0.123	
1470	0.082	0.127	5.8
1480	0.082	0.117	
1490	0.082	0.117	
1500	0.089	0.123	
1510	0.089	0.13	
1520	0.089	0.13	
1530	0.082	0.13	
1540	0.082	0.13	
END			
* - Data obtained from Tide Tables 1991			
U.S. Dept. of Commerce, NOAA			


JAX-159-6 (B)
K = 0.0001955 ft/sec
y0 = 1.639 ft
10.
1.
0.1
0.01
0.001
Drawdown (ft)
0.
16.
32.
48.
64.
80.
Time (sec)
AQTESOLV
GERAGHTY & MILLER, INC.
Modeling Group


JAX-159-12 (A)
K = 3.5268E-05 ft/sec
y0 = 2.086 ft
Drawdown (ft)
10.
1.
0.1
0.01
0.001
0.
90.
180.
270.
360.
450.
Time (sec)
AQTESOLV
GERAGHTY & MILLER, INC.
Modeling Group


JAX-159-12 (B)
K = 3.0905E-05 ft/sec
y0 = 1.875 ft
10.
1.
0.1
0.01
0.001
Drawdown (ft)
0.
114.
228.
342.
456.
570.
Time (sec)
AQTESOLV
GERAGHTY
& MILLER, INC.
Modeling Group

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.
5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-40175

Mr. Cardwell Smith
U.S. Army Engineer District, Savh
P. O. Box 889
Savannah, Georgia 31402-0889

Received: 11 JAN 92

Contract: DACA21-9240181

Project: BLDG 159 Jacksonville NAS
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-1	JAX-159-GH-1	01-10-92
40175-2	JAX-159-GH-2	01-10-92
40175-3	JAX-159-GH-3	01-10-92
40175-4	JAX-159-GH-4	01-10-92
40175-5	JAX-159-GH-5	01-09-92

PARAMETER	40175-1	40175-2	40175-3	40175-4	40175-5
1,2-Dichloropropane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate - Bromochloromethane (70-130) % Rec	87 %	75 %	84 %	84 %	79 %

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-40175

Mr. Cardwell Smith
U.S. Army Engineer District, Savh
P. O. Box 889
Savannah, Georgia 31402-0889

Received: 11 JAN 92

Contract: DACA21-9240181

Project: BLDG 159 Jacksonville NAS
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-1	JAX-159-GH-1	01-10-92
40175-2	JAX-159-GH-2	01-10-92
40175-3	JAX-159-GH-3	01-10-92
40175-4	JAX-159-GH-4	01-10-92
40175-5	JAX-159-GH-5	01-09-92

PARAMETER	40175-1	40175-2	40175-3	40175-4	40175-5
Purgeable Halocarbons (601)					
Bromodichloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<10	<10	<10	<10	<10
Chloroform, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
cis/trans-1,2-Dichloroethyl ene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0

APPENDIX E

LABORATORY ANALYTICAL RESULTS

SL ***SAVANNAH LABORATORIES***
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-1	JAX-159-GH-1	01-10-92
40175-2	JAX-159-GH-2	01-10-92
40175-3	JAX-159-GH-3	01-10-92
40175-4	JAX-159-GH-4	01-10-92
40175-5	JAX-159-GH-5	01-09-92

PARAMETER	40175-1	40175-2	40175-3	40175-4	40175-5
Purgeable Aromatics (602/8020)					
Benzene, ug/l	300	1.0	<1.0	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene, ug/l	61	7.4	<1.0	<1.0	<1.0
Toluene, ug/l	13	<1.0	<1.0	<1.0	<1.0
Xylenes, ug/l	88	14	<1.0	<1.0	<1.0
Methyl-Tert-Butyl-Ether (MTBE), ug/l	39	<10	<10	<10	<10
Total Volatile Organic Aromatics, ug/l	462	22.4	<1.0	<1.0	<1.0
Surrogate - Trifluoro-toluene (70-130 % Rec)	101	115	112	117	109
1,2-Dibromoethane (EDB) , ug/l	<0.020	<0.020	<0.020	<0.020	<0.020
Petroleum Hydrocarbons (418.1), mg/l	1.1	<1.0	<1.0	<1.0	<1.0
Lead, mg/l	0.15	0.23	0.066	0.054	0.20

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40175-3	JAX-159-GH-3	01-10-92
40175-4	JAX-159-GH-4	01-10-92
40175-5	JAX-159-GH-5	01-09-92

PARAMETER	40175-1	40175-2	40175-3	40175-4	40175-5
Polynuclear Aromatic Hydrocarbons (610/8100)					
Acenaphthene, ug/l	<50*	<10	22	<10	<10
Acenaphthylene, ug/l	<50*	<10	25	<10	<10
Benzo(a)pyrene, ug/l	<50*	<10	<10	<10	<10
Benzo(g,h,i)perylene, ug/l	<50*	<10	<10	<10	<10
Benzo(b,k)fluoranthene, ug/l	<50*	<10	<10	<10	<10
Chrysene + Benzo(a)anthracene, ug/l	<50*	<10	<10	<10	<10
Fluoranthene, ug/l	<50*	<10	<10	<10	<10
Fluorene, ug/l	<50*	<10	40	<10	<10
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthracene, ug/l	<50*	<10	<10	<10	<10
Naphthalene, ug/l	<50*	<10	19	<10	<10
Phenanthrene + Anthracene, ug/l	<50*	<10	39	<10	<10
Pyrene, ug/l	<50*	<10	<10	<10	<10
2-Methylnaphthalene, ug/l	<50*	<10	<10	<10	<10
1-Methylnaphthalene, ug/l	<50*	<10	80	<10	<10

* Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

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40175-6	JAX-159-GH-6	01-09-92
40175-7	JAX-159-GH-7	01-09-92
40175-8	JAX-159-GH-8	01-10-92
40175-9	JAX-159-GH-9	01-10-92
40175-10	JAX-159-GH-10	01-10-92

PARAMETER	40175-6	40175-7	40175-8	40175-9	40175-10
Purgeable Halocarbons (601)					
Bromodichloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<10	<10	<10	<10	<10
Chloroform, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
cis/trans-1,2-Dichloroethyl ene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0

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Contract: DACA21-9240181

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REPORT OF RESULTS

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40175-7	JAX-159-GH-7	01-09-92
40175-8	JAX-159-GH-8	01-10-92
40175-9	JAX-159-GH-9	01-10-92
40175-10	JAX-159-GH-10	01-10-92

PARAMETER	40175-6	40175-7	40175-8	40175-9	40175-10
1,2-Dichloropropane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate - Bromochloromethane (70-130) % Rec	78 %	86 %	80 %	83 %	83 %

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40175-7	JAX-159-GH-7	01-09-92
40175-8	JAX-159-GH-8	01-10-92
40175-9	JAX-159-GH-9	01-10-92
40175-10	JAX-159-GH-10	01-10-92

PARAMETER	40175-6	40175-7	40175-8	40175-9	40175-10
Purgeable Aromatics (602/8020)					
Benzene, ug/l	<1.0	<1.0	4.9	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl-Tert-Butyl-Ether (MTBE), ug/l	<10	<10	<10	<10	<10
Total Volatile Organic Aromatics, ug/l	<1.0	<1.0	4.9	<1.0	<1.0
Surrogate - Trifluoro-toluene (70-130 % Rec)	115	100	103	121	112
1,2-Dibromoethane (EDB) , ug/l	<0.020	<0.020	<0.020	<0.020	<0.020
Petroleum Hydrocarbons (418.1), mg/l	<1.0	<1.0	<1.0	<1.0	<1.0
Lead, mg/l	0.082	3.8	0.69	0.12	0.19

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40175-7	JAX-159-GH-7	01-09-92
40175-8	JAX-159-GH-8	01-10-92
40175-9	JAX-159-GH-9	01-10-92
40175-10	JAX-159-GH-10	01-10-92

PARAMETER	40175-6	40175-7	40175-8	40175-9	40175-10
Polynuclear Aromatic Hydrocarbons (610/8100)					
Acenaphthene, ug/l	<10	<10	<10	<10	<10
Acenaphthylene, ug/l	<10	<10	<10	<10	<10
Benzo(a)pyrene, ug/l	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10	<10	<10	<10
Benzo(b,k)fluoranthene, ug/l	<10	<10	<10	<10	<10
Chrysene + Benzo(a)anthracene, ug/l	<10	<10	<10	<10	<10
Fluoranthene, ug/l	<10	<10	<10	<10	<10
Fluorene, ug/l	<10	<10	<10	<10	<10
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthracene, ug/l	<10	<10	<10	<10	<10
Naphthalene, ug/l	<10	<10	<10	<10	<10
Phenanthrene + Anthracene, ug/l	<10	<10	<10	<10	<10
Pyrene, ug/l	<10	<10	<10	<10	<10
2-Methylnaphthalene, ug/l	<10	<10	<10	<10	<10
1-Methylnaphthalene, ug/l	<10	<10	<10	<10	<10

* Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-11	JAX-159-GH-11	01-09-92
40175-12	JAX-159-GH-12	01-09-92
40175-13	JAX-159-GH-13	01-10-92
40175-14	JAX-159-GH-RINSATE BLANK	01-09-92
40175-15	JAX-159-GH-FIELD BLANK	01-09-92

PARAMETER	40175-11	40175-12	40175-13	40175-14	40175-15
Purgeable Halocarbons (601)					
Bromodichloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon Tetrachloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l	<10	<10	<10	<10	<10
Chloroform, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
cis/trans-1,2-Dichloroethyl ene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0

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40175-12	JAX-159-GH-12	01-09-92
40175-13	JAX-159-GH-13	01-10-92
40175-14	JAX-159-GH-RINSATE BLANK	01-09-92
40175-15	JAX-159-GH-FIELD BLANK	01-09-92

PARAMETER	40175-11	40175-12	40175-13	40175-14	40175-15
1,2-Dichloropropane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-Trichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate - Bromochloromethane (70-130) % Rec	79 %	83 %	83 %	85 %	79 %

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40175-13	JAX-159-GH-13	01-10-92
40175-14	JAX-159-GH-RINSATE BLANK	01-09-92
40175-15	JAX-159-GH-FIELD BLANK	01-09-92

PARAMETER	40175-11	40175-12	40175-13	40175-14	40175-15
Polynuclear Aromatic Hydrocarbons (610/8100)					
Acenaphthene, ug/l	<10	<10	<10	<10	<10
Acenaphthylene, ug/l	<10	<10	<10	<10	<10
Benzo(a)pyrene, ug/l	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10	<10	<10	<10
Benzo(b,k)fluoranthene, ug/l	<10	<10	<10	<10	<10
Chrysene + Benzo(a)anthracene, ug/l	<10	<10	<10	<10	<10
Fluoranthene, ug/l	<10	<10	<10	<10	<10
Fluorene, ug/l	<10	<10	<10	<10	<10
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthracene, ug/l	<10	<10	<10	<10	<10
Naphthalene, ug/l	<10	<10	<10	<10	<10
Phenanthrene + Anthracene, ug/l	<10	<10	<10	<10	<10
Pyrene, ug/l	<10	<10	<10	<10	<10
2-Methylnaphthalene, ug/l	<10	<10	<10	<10	<10
1-Methylnaphthalene, ug/l	<10	<10	<10	<10	<10

* Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

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LOG NO: S2-40175

Mr. Cardwell Smith
U.S. Army Engineer District, Savh
P. O. Box 889
Savannah, Georgia 31402-0889

Received: 11 JAN 92

Contract: DACA21-9240181

Project: BLDG 159 Jacksonville NAS
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-11	JAX-159-GH-11	01-09-92
40175-12	JAX-159-GH-12	01-09-92
40175-13	JAX-159-GH-13	01-10-92
40175-14	JAX-159-GH-RINSATE BLANK	01-09-92
40175-15	JAX-159-GH-FIELD BLANK	01-09-92

PARAMETER	40175-11	40175-12	40175-13	40175-14	40175-15
Purgeable Aromatics (602/8020)					
Benzene, ug/l	<1.0	<1.0	2.0	<1.0	<1.0
Chlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, ug/l	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl-Tert-Butyl-Ether (MTBE), ug/l	<10	<10	<10	<10	<10
Total Volatile Organic Aromatics, ug/l	<1.0	<1.0	2.0	<1.0	<1.0
Surrogate - Trifluoro-toluene (70-130 % Rec)	118	112	124	108	120
1,2-Dibromoethane (EDB) , ug/l	<0.020	<0.020	<0.020	<0.020	<0.020
Petroleum Hydrocarbons (418.1), mg/l	<1.0	<1.0	<1.0	<1.0	<1.0
Lead, mg/l	<0.0050	<0.0050	0.29	<0.0050	<0.0050

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-16	JAX-159-GH-6 DUP	01-09-92

PARAMETER	40175-16
Purgeable Halocarbons (601)	
Bromodichloromethane, ug/l	<1.0
Bromoform, ug/l	<5.0
Bromomethane, ug/l	<1.0
Carbon Tetrachloride, ug/l	<1.0
Chlorobenzene, ug/l	<1.0
Chloroethane, ug/l	<1.0
2-Chloroethylvinyl Ether, ug/l	<10
Chloroform, ug/l	<1.0
Chloromethane, ug/l	<1.0
Dibromochloromethane, ug/l	<1.0
1,2-Dichlorobenzene, ug/l	<1.0
1,3-Dichlorobenzene, ug/l	<1.0
1,4-Dichlorobenzene, ug/l	<1.0
Dichlorodifluoromethane, ug/l	<1.0
1,1-Dichloroethane, ug/l	<1.0
1,2-Dichloroethane, ug/l	<1.0
1,1-Dichloroethene, ug/l	<1.0
cis/trans-1,2-Dichloroethylene, ug/l	<1.0
1,2-Dichloropropane, ug/l	<1.0
Cis-1,3-Dichloropropene, ug/l	<1.0
Trans-1,3-Dichloropropene, ug/l	<1.0
Methylene Chloride, ug/l	<1.0
1,1,2,2-Tetrachloroethane, ug/l	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-16	JAX-159-GH-6 DUP	01-09-92
PARAMETER	40175-16	
Tetrachloroethene, ug/l	<1.0	
1,1,1-Trichloroethane, ug/l	<1.0	
1,1,2-Trichloroethane, ug/l	<1.0	
Trichloroethene, ug/l	<1.0	
Trichlorofluoromethane, ug/l	<1.0	
Vinyl Chloride, ug/l	<1.0	
Surrogate - Bromochloromethane (70-130) % Rec	79 %	
Purgeable Aromatics (602/8020)		
Benzene, ug/l	<1.0	
Chlorobenzene, ug/l	<1.0	
1,2-Dichlorobenzene, ug/l	<1.0	
1,3-Dichlorobenzene, ug/l	<1.0	
1,4-Dichlorobenzene, ug/l	<1.0	
Ethylbenzene, ug/l	<1.0	
Toluene, ug/l	<1.0	
Xylenes, ug/l	<1.0	
Methyl-Tert-Butyl-Ether (MTBE), ug/l	<10	
Total Volatile Organic Aromatics, ug/l	<1.0	
Surrogate - Trifluoro- toluene (70-130 % Rec)	113	
1,2-Dibromoethane (EDB) , ug/l	<0.020	
Petroleum Hydrocarbons (418.1), mg/l	<1.0	
Lead, mg/l	0.082	

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-16	JAX-159-GH-6 DUP	01-09-92

PARAMETER	40175-16
Polynuclear Aromatic Hydrocarbons (610/8100)	
Acenaphthene, ug/l	<10
Acenaphthylene, ug/l	<10
Benzo(a)pyrene, ug/l	<10
Benzo(g,h,i)perylene, ug/l	<10
Benzo(b,k)fluoranthene, ug/l	<10
Chrysene + Benzo(a)anthracene, ug/l	<10
Fluoranthene, ug/l	<10
Fluorene, ug/l	<10
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthracene, ug/l	<10
Naphthalene, ug/l	<10
Phenanthrene + Anthracene, ug/l	<10
Pyrene, ug/l	<10
2-Methylnaphthalene, ug/l	<10
1-Methylnaphthalene, ug/l	<10

* Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-17	JAX-159-TRIP BLANK	01-09-92
PARAMETER		40175-17
Purgeable Halocarbons (601)		
Bromodichloromethane, ug/l		<1.0
Bromoform, ug/l		<5.0
Bromomethane, ug/l		<1.0
Carbon Tetrachloride, ug/l		<1.0
Chlorobenzene, ug/l		<1.0
Chloroethane, ug/l		<1.0
2-Chloroethylvinyl Ether, ug/l		<10
Chloroform, ug/l		<1.0
Chloromethane, ug/l		<1.0
Dibromochloromethane, ug/l		<1.0
1,2-Dichlorobenzene, ug/l		<1.0
1,3-Dichlorobenzene, ug/l		<1.0
1,4-Dichlorobenzene, ug/l		<1.0
Dichlorodifluoromethane, ug/l		<1.0
1,1-Dichloroethane, ug/l		<1.0
1,2-Dichloroethane, ug/l		<1.0
1,1-Dichloroethene, ug/l		<1.0
cis/trans-1,2-Dichloroethylene, ug/l		<1.0
1,2-Dichloropropane, ug/l		<1.0
Cis-1,3-Dichloropropene, ug/l		<1.0
Trans-1,3-Dichloropropene, ug/l		<1.0
Methylene Chloride, ug/l		<1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
40175-17	JAX-159-TRIP BLANK	01-09-92
PARAMETER		40175-17
Tetrachloroethene, ug/l		<1.0
1,1,1-Trichloroethane, ug/l		<1.0
1,1,2-Trichloroethane, ug/l		<1.0
Trichloroethene, ug/l		<1.0
Trichlorofluoromethane, ug/l		<1.0
Vinyl Chloride, ug/l		<1.0
Surrogate - Bromochloromethane (70-130) % Rec		78 %
Purgeable Aromatics (602/8020)		
Benzene, ug/l		<1.0
Chlorobenzene, ug/l		<1.0
1,2-Dichlorobenzene, ug/l		<1.0
1,3-Dichlorobenzene, ug/l		<1.0
1,4-Dichlorobenzene, ug/l		<1.0
Ethylbenzene, ug/l		<1.0
Toluene, ug/l		<1.0
Xylenes, ug/l		<1.0
Methyl-Tert-Butyl-Ether (MTBE), ug/l		<10
Surrogate - Trifluoro- toluene (70-130 % Rec)		104

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
40175-18	Method Blank-Water
40175-19	Lab Control Standard (% Recovery)-Water
40175-20	Precision (RPD)-Water
40175-21	Date Extracted-Water
40175-22	Date Analyzed-Water

PARAMETER	40175-18	40175-19	40175-20	40175-21	40175-22
Purgeable Halocarbons (601)					
Bromodichloromethane, ug/l	<1.0	---	---	01.22.92	01.22.92
Bromoform, ug/l	<5.0	---	---	01.22.92	01.22.92
Bromomethane, ug/l	<1.0	---	---	01.22.92	01.22.92
Carbon Tetrachloride, ug/l	<1.0	---	---	01.22.92	01.22.92
Chlorobenzene, ug/l	<1.0	101 %	7.9 %	01.22.92	01.22.92
Chloroethane, ug/l	<1.0	---	---	01.22.92	01.22.92
2-Chloroethylvinyl Ether, ug/l	<10	---	---	01.22.92	01.22.92
Chloroform, ug/l	<1.0	---	---	01.22.92	01.22.92
Chloromethane, ug/l	<1.0	---	---	01.22.92	01.22.92
Dibromochloromethane, ug/l	<1.0	---	---	01.22.92	01.22.92
1,2-Dichlorobenzene, ug/l	<1.0	---	---	01.22.92	01.22.92
1,3-Dichlorobenzene, ug/l	<1.0	---	---	01.22.92	01.22.92
1,4-Dichlorobenzene, ug/l	<1.0	---	---	01.22.92	01.22.92
Dichlorodifluoromethane, ug/l	<1.0	---	---	01.22.92	01.22.92
1,1-Dichloroethane, ug/l	<1.0	---	---	01.22.92	01.22.92
1,2-Dichloroethane, ug/l	<1.0	---	---	01.22.92	01.22.92
1,1-Dichloroethene, ug/l	<1.0	96 %	16 %	01.22.92	01.22.92
cis/trans-1,2-Dichloroethyl ene, ug/l	<1.0	---	---	01.22.92	01.22.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
40175-18	Method Blank-Water
40175-19	Lab Control Standard (% Recovery)-Water
40175-20	Precision (RPD)-Water
40175-21	Date Extracted-Water
40175-22	Date Analyzed-Water

PARAMETER	40175-18	40175-19	40175-20	40175-21	40175-22
1,2-Dichloropropane, ug/l	<1.0	---	---	01.22.92	01.22.92
Cis-1,3-Dichloropropene, ug/l	<1.0	---	---	01.22.92	01.22.92
Trans-1,3-Dichloropropene, ug/l	<1.0	---	---	01.22.92	01.22.92
Methylene Chloride, ug/l	<1.0	---	---	01.22.92	01.22.92
1,1,2,2-Tetrachloroethane, ug/l	<1.0	---	---	01.22.92	01.22.92
Tetrachloroethene, ug/l	<1.0	---	---	01.22.92	01.22.92
1,1,1-Trichloroethane, ug/l	<1.0	---	---	01.22.92	01.22.92
1,1,2-Trichloroethane, ug/l	<1.0	---	---	01.22.92	01.22.92
Trichloroethene, ug/l	<1.0	114 %	20 %	01.22.92	01.22.92
Trichlorofluoromethane, ug/l	<1.0	---	---	01.22.92	01.22.92
Vinyl Chloride, ug/l	<1.0	---	---	01.22.92	01.22.92
Purgeable Aromatics (602/8020)					
Benzene, ug/l	<1.0	94 %	5.3 %	01.22.92	01.22.92
Chlorobenzene, ug/l	<1.0	98 %	3.1 %	01.22.92	01.22.92
1,2-Dichlorobenzene, ug/l	<1.0	---	---	01.22.92	01.22.92
1,3-Dichlorobenzene, ug/l	<1.0	---	---	01.22.92	01.22.92
1,4-Dichlorobenzene, ug/l	<1.0	---	---	01.22.92	01.22.92
Ethylbenzene, ug/l	<1.0	---	---	01.22.92	01.22.92
Toluene, ug/l	<1.0	94 %	2.1 %	01.22.92	01.22.92
Xylenes, ug/l	<1.0	---	---	01.22.92	01.22.92
Methyl-Tert-Butyl-Ether (MTBE), ug/l	<10	---	---	01.22.92	01.22.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
40175-18	Method Blank-Water
40175-19	Lab Control Standard (% Recovery)-Water
40175-20	Precision (RPD)-Water
40175-21	Date Extracted-Water
40175-22	Date Analyzed-Water

PARAMETER	40175-18	40175-19	40175-20	40175-21	40175-22
Total Volatile Organic Aromatics, ug/l	<1.0	---	---	01.22.92	01.22.92
1,2-Dibromoethane (EDB) , ug/l	<0.020	102 %	14 %	01.15.92	01.15.92
Polynuclear Aromatic Hydrocarbons (610/8100)					
Acenaphthene, ug/l	<10	82 %	4.9 %	01.14.92	02.10.92
Acenaphthylene, ug/l	<10	---	---	01.14.92	02.10.92
Benzo(a)pyrene, ug/l	<10	101 %	2.0 %	01.14.92	02.10.92
Benzo(g,h,i)perylene, ug/l	<10	---	---	01.14.92	02.10.92
Benzo(b,k)fluoranthene, ug/l	<10	---	---	01.14.92	02.10.92
Chrysene + Benzo(a)anthracene, ug/l	<10	---	---	01.14.92	02.10.92
Fluoranthene, ug/l	<10	---	---	01.14.92	02.10.92
Fluorene, ug/l	<10	86 %	4.7 %	01.14.92	02.10.92
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthracene, ug/l	<10	---	---	01.14.92	02.10.92
Naphthalene, ug/l	<10	88 %	4.5 %	01.14.92	02.10.92
Phenanthrene + Anthracene, ug/l	<10	---	---	01.14.92	02.10.92
Pyrene, ug/l	<10	95 %	2.1 %	01.14.92	02.10.92
2-Methylnaphthalene, ug/l	<10	---	---	01.14.92	02.10.92
1-Methylnaphthalene, ug/l	<10	---	---	01.14.92	02.10.92
Petroleum Hydrocarbons (418.1), mg/l	<1.0	112 %	13 %	01.21.92	01.21.92

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40175-18	Method Blank-Water
40175-19	Lab Control Standard (% Recovery)-Water
40175-20	Precision (RPD)-Water
40175-21	Date Extracted-Water
40175-22	Date Analyzed-Water

PARAMETER	40175-18	40175-19	40175-20	40175-21	40175-22
Lead, mg/l	<0.0050	102 %	2.0 %	---	01.29.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE SAMPLED
40175-23	JAX-159-GRAB-1	01-10-92
40175-24	JAX-159-GRAB-2	01-10-92

PARAMETER	40175-23	40175-24
Percent Solids, %	74 %	57 %
Polynuclear Aromatic Hydrocarbons (610/8100)		
Acenaphthene, ug/kg dw	<270	1800
Acenaphthylene, ug/kg dw	<270	880
Benzo(a)pyrene, ug/kg dw	380	6900
Benzo(g,h,i)perylene, ug/kg dw	<270	<350
Benzo(b,k)fluoranthene, ug/kg dw	360	7100
Chrysene + Benzo(a)anthracene, ug/kg dw	<270	2700
Fluoranthene, ug/kg dw	<270	470
Fluorene, ug/kg dw	<270	<350
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthracene, ug/kg dw	670	1700
Naphthalene, ug/kg dw	<270	<350
Phenanthrene + Anthracene, ug/kg dw	<270	<350
Pyrene, ug/kg dw	<270	600
2-Methylnaphthalene, ug/kg dw	<270	380
1-Methylnaphthalene, ug/kg dw	<270	360
Lead, mg/kg dw	2.0	610

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE SAMPLED
40175-23	JAX-159-GRAB-1	01-10-92
40175-24	JAX-159-GRAB-2	01-10-92

PARAMETER	40175-23	40175-24
Halogenated Volatiles (8010)		
Benzyl chloride, ug/kg dw	<6.8	<8.8
Bromobenzene, ug/kg dw	<6.8	<8.8
Bromodichloromethane, ug/kg dw	<6.8	<8.8
Bromoform, ug/kg dw	<34	<44
Bromomethane, ug/kg dw	<6.8	<8.8
Carbon Tetrachloride, ug/kg dw	<6.8	<8.8
Chlorobenzene, ug/kg dw	<6.8	<8.8
Chloroethane, ug/kg dw	<6.8	<8.8
Chloroform, ug/kg dw	<6.8	<8.8
1-Chlorohexane, ug/kg dw	<6.8	<8.8
2-Chloroethylvinyl Ether, ug/kg dw	<68	<88
Chloromethane, ug/kg dw	<6.8	<8.8
Chlorotoluene, ug/kg dw	<6.8	<8.8
Dibromochloromethane, ug/kg dw	<6.8	<8.8
Dibromomethane, ug/kg dw	<6.8	<8.8
1,2-Dichlorobenzene, ug/kg dw	<6.8	<8.8
1,3-Dichlorobenzene, ug/kg dw	<6.8	<8.8
1,4-Dichlorobenzene, ug/kg dw	<6.8	<8.8
Dichlorodifluoromethane, ug/kg dw	<6.8	<8.8
1,1-Dichloroethane, ug/kg dw	<6.8	<8.8
1,2-Dichloroethane, ug/kg dw	<6.8	<8.8
1,1-Dichloroethene, ug/kg dw	<6.8	<8.8

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-40175

Received: 11 JAN 92

Mr. Cardwell Smith
U.S. Army Engineer District, Savh
P. O. Box 889
Savannah, Georgia 31402-0889

Contract: DACA21-9240181

Project: BLDG 159 Jacksonville NAS
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE SAMPLED
40175-23	JAX-159-GRAB-1	01-10-92
40175-24	JAX-159-GRAB-2	01-10-92

PARAMETER	40175-23	40175-24
cis/trans-1,2-Dichloroethylene, ug/kg dw	<6.8	<8.8
Dichloromethane, ug/kg dw	<6.8	<8.8
1,2-Dichloropropane, ug/kg dw	<6.8	<8.8
1,3-Dichloropropylene, ug/kg dw	<6.8	<8.8
1,1,2,2-Tetrachloroethane, ug/kg dw	<6.8	<8.8
1,1,1,2-Tetrachloroethane, ug/kg dw	<6.8	<8.8
Tetrachloroethene, ug/kg dw	<6.8	<8.8
1,1,1-Trichloroethane, ug/kg dw	<6.8	<8.8
1,1,2-Trichloroethane, ug/kg dw	<6.8	<8.8
Trichloroethene, ug/kg dw	<6.8	<8.8
Trichlorofluoromethane, ug/kg dw	<6.8	<8.8
1,2,3-Trichloropropane, ug/kg dw	<6.8	<8.8
Vinyl Chloride, ug/kg dw	<6.8	<8.8
Surrogate - Bromochloromethane (70-130) % Rec	101 %	79 %
Aromatic Volatiles (8020)		
Benzene, ug/kg dw	<6.8	<8.8
Chlorobenzene, ug/kg dw	<6.8	<8.8
1,2-Dichlorobenzene, ug/kg dw	<6.8	<8.8
1,3-Dichlorobenzene, ug/kg dw	<6.8	<8.8
1,4-Dichlorobenzene, ug/kg dw	<6.8	<8.8
Ethylbenzene, ug/kg dw	<6.8	<8.8
Toluene, ug/kg dw	<6.8	<8.8
Xylenes, ug/kg dw	<6.8	<8.8
Methyl Tert Butyl Ether (MTBE), ug/kg	<68	<88
Surrogate - Trifluoro- toluene (70-130 % Rec)	104	101

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID
40175-25	Method Blank-Soil
40175-26	Lab Control Standard (% Recovery)-Soil
40175-27	Precision (% RPD)-Soil
40175-28	Date Extracted-Soil
40175-29	Date Analyzed-Soil

PARAMETER	40175-25	40175-26	40175-27	40175-28	40175-29
Polynuclear Aromatic Hydrocarbons (610/8100)					
Acenaphthene, ug/kg dw	<200	70 %	5.7 %	01.20.92	01.25.92
Acenaphthylene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Benzo(a)pyrene, ug/kg dw	<200	78 %	0 %	01.20.92	01.25.92
Benzo(g,h,i)perylene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Benzo(b,k)fluoranthene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Chrysene + Benzo(a)anthracene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Fluoranthene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Fluorene, ug/kg dw	<200	78 %	5.1 %	01.20.92	01.25.92
Indeno(1,2,3-cd)pyrene+Dibenzo(a,h)anthracene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Naphthalene, ug/kg dw	<200	76 %	11 %	01.20.92	01.25.92
Phenanthrene + Anthracene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Pyrene, ug/kg dw	<200	105 %	1.9 %	01.20.92	01.25.92
2-Methylnaphthalene, ug/kg dw	<200	---	---	01.20.92	01.25.92
1-Methylnaphthalene, ug/kg dw	<200	---	---	01.20.92	01.25.92
Lead, mg/kg dw	<0.50	109 %	4.6 %	---	01.29.92

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40175-29	Date Analyzed-Soil

PARAMETER	40175-25	40175-26	40175-27	40175-28	40175-29
Halogenated Volatiles (8010)					
Benzyl chloride, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Bromobenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Bromodichloromethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Bromoform, ug/kg dw	<25	---	---	01.23.92	01.23.92
Bromomethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Carbon Tetrachloride, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Chlorobenzene, ug/kg dw	<5.0	109 %	9.2 %	01.23.92	01.23.92
Chloroethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Chloroform, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1-Chlorohexane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
2-Chloroethylvinyl Ether, ug/kg dw	<50	---	---	01.23.92	01.23.92
Chloromethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Chlorotoluene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Dibromochloromethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Dibromomethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,2-Dichlorobenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,3-Dichlorobenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,4-Dichlorobenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Dichlorodifluoromethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92

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Contract: DACA21-9240181

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P. O. Box 889
Savannah, Georgia 31402-0889

Project: BLDG 159 Jacksonville NAS
Sampled By: Client

REPORT OF RESULTS

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40175-25	Method Blank-Soil
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40175-27	Precision (% RPD)-Soil
40175-28	Date Extracted-Soil
40175-29	Date Analyzed-Soil

PARAMETER	40175-25	40175-26	40175-27	40175-28	40175-29
1,1-Dichloroethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,2-Dichloroethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,1-Dichloroethene, ug/kg dw	<5.0	96 %	9.4 %	01.23.92	01.23.92
cis/trans-1,2-Dichloroethyl ene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Dichloromethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,2-Dichloropropane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,3-Dichloropropylene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Tetrachloroethene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,1,1-Trichloroethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,1,2-Trichloroethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Trichloroethene, ug/kg dw	<5.0	104 %	13 %	01.23.92	01.23.92
Trichlorofluoromethane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,2,3-Trichloropropane, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Vinyl Chloride, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Surrogate - Bromochloromethane (70-130) % Rec	111 %	---	---	---	---

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Sampled By: Client

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40175-26	Lab Control Standard (% Recovery)-Soil
40175-27	Precision (% RPD)-Soil
40175-28	Date Extracted-Soil
40175-29	Date Analyzed-Soil

PARAMETER	40175-25	40175-26	40175-27	40175-28	40175-29
Aromatic Volatiles (8020)					
Benzene, ug/kg dw	<5.0	121 %	23 %	01.23.92	01.23.92
Chlorobenzene, ug/kg dw	<5.0	100 %	1.0 %	01.23.92	01.23.92
1,2-Dichlorobenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,3-Dichlorobenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
1,4-Dichlorobenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Ethylbenzene, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Toluene, ug/kg dw	<5.0	106 %	13.2 %	01.23.92	01.23.92
Xylenes, ug/kg dw	<5.0	---	---	01.23.92	01.23.92
Methyl Tert Butyl Ether (MTBE), ug/kg	<50	---	---	---	01.23.92
Surrogate - Trifluoro-toluene (70-130 % Rec)	83 %	---	---	---	---

Methods: EPA SW-846 and 40 CFR Part 136.
Savannah Environmental Laboratory HRS Cert. #87052
Savannah Drinking Water HRS Cert. #87279

Steven J. White

Steven J. White

SL SAVANNAH LABORATORIES
ENVIRONMENTAL SERVICES, INC.

5102 Lafroche Avenue, Savannah, GA 31404 — Phone: (912) 354-7858 — Fax (912) 352-0165
2846 Industrial Plaza Drive, Tallahassee, FL 32301 — Phone: (904) 878-3994 — Fax (904) 878-9504
414 Southwest 12th Avenue, Deerfield Beach, FL 33442 — Phone: (305) 421-7400 — Fax (305) 421-2584
900 Lakeside Drive, Mobile, AL 36693 — Phone: (205) 666-6633 — Fax (205) 666-6696
6712 Benjamin Road, Suite 100, Tampa, FL 33634 — Phone: (813) 885-7427 — Fax (813) 885-7049

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

P.O. NUMBER	PROJECT NUMBER	PROJECT NAME
		Bldg 159 Jacksonville NAS

CLIENT NAME	TELEPHONE/FAX NO.
U.S. Army Corps of Engineers - Savannah Dist.	912-944-5674

CLIENT ADDRESS	CITY, STATE, ZIP CODE
P.O. Box 889	Savannah, GA 31402

SAMPLER(S) NAME(S)	CLIENT PROJECT MANAGER
M. Fife	Cardwell Smith

PAGE 1 OF 2

☐ STANDARD TAT

☐ EXPEDITED TAT *

REPORT DUE DATE _____

* SUBJECT TO RUSH FEES

SAMPLING DATE	SAMPLING TIME	SAMPLE IDENTIFICATION	MATRIX TYPE: AQUEOUS MATRIX	NONAQUEOUS MATRIX	OIL MATRIX	AIR MATRIX	REQUIRED ANALYSES (F/a Kerosene Group): TPH	LEAD	601/602/EDB	610	NUMBER OF CONTAINERS SUBMITTED
1-10-92	1255	JAX-159-GH-1	X								9 containers
"	1120	JAX-159-GH-2	X								9 "
"	0930	JAX-159-GH-3	X								9 "
"	0800	JAX-159-GH-4	X								9 "
1-9-92	1525	JAX-159-GH-5	X				1	1	5	2	9 "
"	1430	JAX-159-GH-6	X				1	1	5	2	9 "
"	1545	JAX-159-GH-7	X				1	1	5	2	9 "
1-10-92	1415	JAX-159-GH-8	X								9 "
"	1000	JAX-159-GH-9	X								9 "
"	0845	JAX-159-GH-10	X								9 "
1-9-92	1645	JAX-159-GH-11	X				1	1	5	2	9 "
"	1510	JAX-159-GH-12	X				1	1	5	2	9 "

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	01/07	8:00	[signature]	01/07	0830			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
						Angela Zealy	1/7/92	3:50 pm

FOR SAVANNAH LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	S.L. LOG NO.	LABORATORY REMARKS
J. Johnson	1/11/92	3:50	☑ YES ☐ NO		40175	

ORIGINAL